



Indonesia's and Germany's QI Systems at a Glance – A comparative analysis

The comparative study of the Indonesian and German QI systems contributes to the mutual understanding of both systems and provides selected recommendations on what each country can learn and adopt from each other and how the dialogue should be continued.

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Authors

Mr. Christian Schoen, Mesopartner PartG
Mrs. Ellia Kristiningrum, National Research and Innovation Agency of Indonesia/BRIN

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List of abbreviations

ACCSQ	ASEAN Consultative Committee on Standards and Quality
AHEEERR	ASEAN Harmonized Electrical and Electronic Equipment Regulatory Regime
AkkStelleG	Gesetz über die Akkreditierungsstelle (Akkreditierungsstellengesetz) <i>Accreditation Body Act</i>
AMS	ASEAN Member States
APAC	Asia Pacific Accreditation Cooperation Incorporated
APLMF	Asia Pacific Legal Metrology Forum
APMP	Asia Pacific Metrology Programme
ASEAN	Association of Southeast Asian Nations
ASTM	American Society for Testing and Materials
BAM	Bundesanstalt für Materialforschung und -prüfung <i>Federal Institute for Materials Research and Testing</i>
BANGBENI	Barang ber-SNI SNI certified goods
BIPM	Bureau International des Poids et Mesures <i>International Bureau of Weights and Measures</i>
BMWK	Bundesministerium für Wirtschaft und Klimaschutz <i>Federal Ministry for Economic Affairs and Climate Action</i>
BMZ	Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung <i>Federal Ministry of Economic Cooperation and Development</i>
BNetzA	Bundesnetzagentur
BSKJI	Badan Standardisasi dan Kebijakan Jasa Industri. <i>Agency for Industrial Standardisation and Service Policy</i>
BSN	Badan Standardisasi Nasional <i>National Standardization Agency of Indonesia</i>
BVL	Bundesamt für Verbraucherschutz und Lebensmittelsicherheit Federal Office of Consumer Protection and Food Safety
CAB	Conformity Assessment Body
CAC	Codex Alimentarius Commission
CASCO	ISO committee for conformity assessment
CE	Communauté/Conformité Européenne (European Community Conformity)
CEN	European Committee for Standardization
CENELEC	European Committee for Electrotechnical Standardization

CGPM	Conference on Weights and Measures
CIPM	International Committee for Weights and Measures
CISPR	Comité International Spécial des Perturbations Radioélectriques
CMC	Calibration and measurement capabilities
COPOLCO	Committee on Consumer Policy
ISO DEVCO	ISO for Developing Country
DAkks	Deutsche Akkreditierungsstelle <i>Germany's national accreditation body</i>
DIN	Deutsches Institut für Normung <i>German Institute for Standardisation</i>
DKE	Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE <i>German Commission for Electrical, Electronic & Information Technologies of DIN and VDE</i>
DMÜF	Deutsches Marktüberwachungsforum <i>German Market Surveillance Forum</i>
DJBC	Direktorat Jendral Bea Cukai <i>Directorate General of Customs and Excise</i>
EA	European co-operation for Accreditation
EMC	Electromagnetic compatibility
EGM	ASEAN Expert Group on Metrology
ETSI	European Telecommunications Standards Institute
EU	European Union
EURAMET	European Association of National Metrology Institutes
FTA	Free trade agreement
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit
GPQI	Global Project Quality Infrastructure
GS	Geprüfte Sicherheit <i>Tested Safety</i>
IAF	International Accreditation Forum
ICSMS	Information and Communication System on Market Surveillance
IEC	International Electrotechnical Commission
IECEE CB	IEC System for Conformity Assessment Schemes for Electrotechnical Equipment and Components Certification Body
ILAC	International Laboratory Accreditation Cooperation
ILC	Interlaboratory comparison
ISO	International Organization for Standardisation
ITU	International Telecommunication Union

JIS	Japanese Industrial Standards
KAN	Komite Akreditasi Nasional
KBLI	Klasifikasi Baku Lapangan Usaha Indonesia <i>Indonesian Standard Industrial Classification</i>
LPKSM	Lembaga Perlindungan Konsumen Swadaya Masyarakat <i>Non-Governmental Consumer Protection Agency</i>
MEPS	Minimum Energy Performance Standards
MLA	Multilateral recognition agreement/multilateral agreement
Mol	Kementerian Perindustrian <i>Ministry of Industry</i>
MoT	Kementerian Perdagangan <i>Ministry of Trade</i>
MRA	Mutual recognition agreement/arrangement
MesseEG	Mess- und Eichgesetz <i>Measures and Verification Act</i>
NANDO	New Approach Notified and Designated Organisations
NIB	Nomor Induk Berusaha <i>Business Registration Number</i>
NLF	New legislative framework
NMI	National Metrology Institute
NPB	Nomor Pendaftaran Barang <i>Goods Registration Number</i>
NQI	National Quality Infrastructure
NRP	Nomor Registrasi Pokok <i>Principal Registration Number</i>
OIML	International Organization of Legal Metrology
OIML-CS	OIML certification system
OJEU	Official Journal of the EU
OSS	Online Single Submission
PASC	Pacific Area Standards Congress
PDC	Policy Development Committee
PNPS	Program Nasional Perumusan Standar <i>National Programme for Standards Formulation</i>
PRNT	Program Nasional Regulasi Teknis <i>National Programme for Technical Regulations</i>
PTB	Physikalisch-Technische Bundesanstalt <i>National Metrology Institute of Germany</i>
ProdSG	Produktsicherheitsgesetz <i>Product Safety Act</i>

RAPEX	EU rapid alert system for dangerous non-food products (Rapid Exchange of Information System)
QI	Quality infrastructure
RED	Radio Equipment Directive
SDO(s)	Standards developing organisation(s)
SI	International System of Units
SMEs	Small and Medium Enterprises
SMIIC	Standards and Metrology Institute for Islamic Countries
SNI	Standar Nasional Indonesia <i>Indonesian National Standard</i>
SNSU	Standar Nasional Satuan Ukuran <i>National Measurement Standards</i>
SPPT SNI	Surat Persetujuan Penggunaan Tanda SNI <i>Letter of Approval for the Use of SNI Marks</i>
SPS	Sanitary and Phytosanitary Measures
SVLK	Sistem Verifikasi Legalitas Kayu <i>Timber Legality Assurance System</i>
TBT	Technical barrier to trade
TC	Technical Committees
TÜV	Technischer Überwachungsverein <i>Technical inspection association</i>
UBA	Umweltbundesamt <i>German Environment Agency</i>
UTTP	Ukur, Takar, Timbang, dan Perlengkapannya <i>Measure, Dosis, Weigh, and Equipment</i>
VDE	Verband der Elektrotechnik Elektronik Informationstechnik <i>Association for Electrical, Electronic & Information Technologies</i>
WELMEC	European Cooperation in Legal Metrology (earlier: Western European Legal Metrology Cooperation)
WTO	World Trade Organization
ZLS	Zentralstelle der Länder für Sicherheitstechnik <i>Central Authority of the Federal States for Safety Engineering</i>

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Executive summary

Quality Infrastructure (QI) is a complex system comprising organisations, services and technical specifications to build trust in the quality of products and services. QI includes national and international metrology systems, standardisation, accreditation and conformity assessment (testing, certification, calibration, inspection, and verification), all creating trust in international trade and safeguarding consumers and the environment. An efficient and effective QI system enhances competitiveness, provides market access, improves productivity and fosters product and process innovation. It also helps protect the environment, ensures safety and promotes the health of citizens.

The Indonesian QI system

In Indonesia, standardisation (formulation of Indonesian National Standards/SNIs) and conformity assessment are implemented under the responsibility of the National Standardization Agency (Badan Standardisasi Nasional – BSN), while accreditation of conformity assessment bodies (CABs) is carried out by the National Accreditation Body of Indonesia (Komite Akreditasi Nasional – KAN). BSN manages Indonesia's metrology system for Scientific Metrology and the Ministry of Trade for Legal Metrology. BSN creates conformity assessment schemes, which help facilitate conformity assessment activities. Indonesia participates in various international and regional cooperation arrangements with other metrology institutions.

The German QI system

Germany's Quality Infrastructure has developed organically and widely over the last 150 years. Today, the QI system is highly developed and some German QI institutions, especially PTB and DIN, are global pioneers in their fields. As a member of the European Union (EU) and of the single market, the country's QI is harmonised with the EU's QI system.

Germany has two national standards organisations, DIN (Deutsches Institut für Normung) and DKE (Deutsche Kommission Elektrotechnik Elektronik Informationstechnik). These organisations are closely linked with the European and international standardisation systems. Legal metrology in Germany is also part of the more extensive European system. To ensure global recognition of national measurement standards and the dissemination of SI units within Germany, PTB (Physikalisch-Technische Bundesanstalt) and its three designated institutes play a crucial role. The German national accreditation body, DAkkS (Deutsche Akkreditierungsstelle), has been in operation since 2010, legally entrusted with the mandate for accreditation in Germany. In the regulated area, conformity assessment is carried out by accredited and legally authorised CABs. CABs use standards and private schemes to assess compliance in the unregulated area.

Similarities and differences between the Indonesian and German QI systems

The **legal and regulatory frameworks** for QI in both countries differ. Germany has no overarching QI law but single laws for each QI component. Those laws and other QI-related regulations are influenced by EU legislation in the interest of the EU single market. Indonesia has one overarching QI law, complemented by a legal metrology law. Its membership in ASEAN does not directly influence its QI legislation. Regional harmonisation in ASEAN is based on voluntary agreements. Furthermore, the EU – and therefore Germany – increasingly rely on deregulation to ensure product safety by combining voluntary standards and regulations. In Indonesia, mandatory standards are the instrument of choice to ensure product compliance with safety and health requirements.

Both countries have organisations legally recognised by their respective countries to facilitate and manage standardisation activities. The

Government supports the budget for standardisation activities in Indonesia, while the standardisation budget is primarily financed through revenue from the sale of standards in Germany. Germany has developed three times more standards than Indonesia. Moreover, the number of experts involved in technical committees is three times higher in Germany.

The time taken to develop a standard is similar in the two countries, including the time needed for fast-track standard development, such as SPECS. Even though the application of standards in both countries is voluntary in principle, in Indonesia standards can be made mandatory through the relevant technical regulations.

Both countries have developed **metrology systems** connected and recognised by the international alliances of metrology and legal metrology. The German metrology system and institution have a long history, which, together with a very exacting industrial sector in Germany leads to a higher number of measurement capacities in Germany compared to Indonesia. In both countries, the industrial sector is served by an extensive network of secondary calibration laboratories. Sub-national legal metrology units verify regulated measuring instruments to protect consumers and the environment. The NMIs in both countries are differently structured and embedded in the overall institutional QI structure. Legal metrology is under a different lead agency in Indonesia than the other metrology fields. In Germany, PTB plays a lead role in all three areas.

Both countries have vibrant markets for **conformity assessment services**. Large numbers of CABs offer services in regulated and non-regulated quality assurance areas. The CABs must be officially notified by authorities to perform their services in the regulated area. Both countries operate one independent national accreditation body and pursue the same universally valid accreditation principles. KAN and DAkkS offer services in almost all accreditation schemes. However, bio-banking accreditation still needs to be developed by both organisations.

Germany and Indonesia have the legal authority to conduct product and **market surveillance** activities. Market surveillance activities are carried out similarly, including pre-planned surveillance (proactive or regular) and surveillance as a response to an incident (reactive or special). In Germany, product surveillance mostly takes place in markets, whereas surveillance in Indonesia occurs equally before and after a product enters the market.

Case study

Taking an electric motor as an example, this study explains the practical functioning of quality infrastructure and its components in Indonesia and Germany. The electric motor is a product that is produced, exported, imported and widely used in both countries. Standards and QI services are available and offered, with regard in particular to the quality and safety of products manufactured in Indonesia, Germany/the EU. The electric motor example at the end of each section describes the QI systems in each country.

Prospects for the QI systems

The QI systems of both countries are constantly changing and developing to meet new challenges and conditions. Two central challenges are digitalisation and transitioning to a sustainable and climate-neutral economy. Digitalisation involves both the digitalisation of QI itself and support for QI institutions' customers in their digitalisation processes through metrology, standards and conformity assessment.

Recommendations

It is essential to continuously review and upgrade the QI in each country to ensure that it remains effective, efficient and relevant to the needs of industries and society. This study sheds light on inspiring practices and future demands. These were used to elaborate the following recommendations for the two countries.

- Develop and update **standards** (and regulations) reflecting the requirements of the **digital economy**, e.g. artificial intelligence in the medical sector or additive manufacturing (3D printing).

- QI institutions of both countries should share experiences on the **digitalisation of QI**. Indonesia could benefit from ongoing European or German initiatives, such as the German standardisation roadmap on AI and the QI Digital consortium.
- Given the potential impact on market competition, innovation and SME development, Indonesia should reconsider how many **SNIs** it implements as **mandatory**. Meticulous regulatory impact assessments carried out before the launch of a standard should be used to determine whether an SNI should be mandatory or voluntary; all SNIs should be reassessed at 5-year intervals.
- **Indonesia to develop metrology CMCs** in all areas, but particularly in the measurement fields of Chemistry and Biology (QM), Length (L), Ionizing Radiation (RI) and Photometry and Radiometry (PR). Photometry and Radiometry CMCs are relevant to the solar energy sector.
- **Exchange on** respective attempts to develop **QI services** for a **circular economy** and for the **energy transition** (supporting the JETP initiative of Indonesia and decarbonising the energy sector).
- Develop **additional accreditation services**. While Indonesia needs accreditation services targeting **reference material** producers (ISO 17034:2016), both Indonesia and Germany must develop and offer a service to accredit **biobanking facilities** (ISO 20387:2018).
- There is an interdependence between the organisational structures and funding of KAN and BSN. The relationship between these two organisations has the potential to influence KAN's independence in carrying out its functions if BSN also carries out conformity assessment activities (certification, testing, inspection). The ideal concept of separating standards development institutions, metrology institutions and accreditation institutions as three separate government institutions is a long-term target in line with increasing coordination between government institutions in Indonesia

1. Introduction



1.1 Understanding Quality Infrastructure and its functions

Quality Infrastructure (QI) is a complex system of organisations, services and technical specifications designed to create trust in the quality of products and services. QI comprises the national and international system of metrology, standardisation, accreditation and conformity assessment (testing, certification, calibration, inspection, verification), which creates confidence in international trade and helps protect consumers and the environment. An efficient and effective QI enhances competitiveness and market access, upgrades productivity, and contributes to product and process innovation, environmental protection, safety and the health of citizens.

Trade and competitiveness

International trade is considered an engine for prosperity and poverty reduction. QI makes domestic markets more effective and facilitates their access to foreign markets. This is achieved through quality assurance, compliance with standards and meeting consumer requirements at home and abroad. QI helps meet market requirements and address social and environmental aspects, while international QI system harmonisation can help avoid unnecessary trade barriers between different markets.

Countries like Indonesia and Germany produce export products and participate in global trade. The ability to produce and sell high-quality products globally contributes to countries' economic growth and prosperity. Consistent product quality is a crucial success factor in this respect. The German quality mark 'Made in Germany' has helped the country maintain high international competitiveness in specific product markets and has shaped its economic success for many decades.

QI increases market efficiency by offering quality assurance services and helping to eliminate restrictive regulations. The national quality infrastructure (NQI) equips companies with the knowledge and tools necessary to meet international standards, facilitating their access to foreign markets. Upgrading the NQI usually leads to

better opportunities to export and diversify products, attract investment, access global value chains and earn foreign currency.

Consumer protection

QI helps consumers make informed decisions through increased transparency. It ensures that food and water are safe and fit for consumption, thus protecting people's health and well-being. It helps control water pollution and efficiency of delivery.

With effective enforcement mechanisms such as pre-market and market surveillance, technical regulations can be useful in tackling issues such as fraudulent and counterfeit products in the market. Certification creates trust that a product's ingredients or components are safe and that all processes used in the manufacture of such products are environmentally sound and socially acceptable.

Health protection

QI ensures that health testing results are reliable and that medical equipment is fit for purpose. Standardised occupational health and safety management systems are designed to help companies and organisations worldwide protect the health and safety of their employees.

Environmental protection

QI can improve the environmental performance of materials and products, enhance energy efficiency and advance sustainable infrastructure development. Besides enhancing energy efficiency in energy consumption and transmission, QI supports the transition to clean energy by adapting standards and technical regulations for renewable energy solutions in line with good international practices, and by upgrading testing, certification and metrology capacities to ensure high-quality components and systems.

QI encourages companies and governments to integrate sustainable practices within their procurement processes. This can help lower a country's ecological footprint and support it in reaching its targets under the Sustainable Development

Goals (SDGs) and the enhanced environmental, social and governance (ESG) standards.

Contribution to product and process innovation
All elements of QI contribute to a society's ability to address various environmental and technological challenges by creating and developing new technologies. QI and innovation are closely related. QI is important in supporting innovation. All QI elements are needed to ensure that new products and services are safe and meet necessary quality requirements. At the same time, innovation is essential for QI, as new technologies and processes can be used to assess the quality and safety of goods and services. Furthermore, innovation fosters the development of new standards and regulations, encouraging QI improvement.

QI and innovation are mutually reinforcing and critical for economic growth and competitiveness. QI provides the necessary support for innovation, while innovation drives improvements in QI.

Quality Infrastructure as a system

The concept of a quality system originates in management theory and practice. A quality management system (QMS) is a formalised system that documents processes, procedures and responsibilities for achieving quality policies and objectives. A QMS helps coordinate and control an organisation's activities to meet customer and regulatory requirements and continuously improve its effectiveness and efficiency.

The QI concept lifts the ideas of the quality management system to the level of a national economy. The QI system comprises four central components: standards define quality criteria based on best practices; conformity assessment verifies that products and services meet the standard requirements; accreditation confirms the technical competence and independence of the conformity assessment bodies; metrology ensures the comparability of weights and other measures and anchors the system scientifically. The government's role as regulator and market supervisor is today considered an additional element of the QI system.

National QI systems usually develop organically over time as service needs arise and producers, consumers or citizens articulate specific service requirements. Such a development trajectory can follow a formally defined quality policy or it may be spontaneous and less strategic. As an economy diversifies and shifts from a more agricultural and commodity-based focus towards advanced manufacturing and service provision, QI services usually become essential for national companies seeking to enter and compete in international markets.

In Germany, the critical pillars of the QI system started to take shape about 150 years ago and then developed in parallel to the country's growth path over subsequent decades. In Indonesia, the process started 30-40 years ago, when the agrarian and commodity-focused economy diversified towards the manufacture of advanced products for global markets.

However, the concept and term 'quality infrastructure' is relatively new in both countries and stems from international development cooperation. The term QI was first coined in the early 2000s by the international cooperation unit of the German National Metrology Institute (PTB) and the United Nations Industrial Development Organization (UNIDO). In Indonesia, this term has been adopted and defined as a national standardisation and conformity assessment system. It is a horizontal system, in which the main activities are standardisation, metrology, testing, certification, accreditation and market surveillance.

1.2 The GPQI project and comparative study

The Global Project Quality Infrastructure (GPQI), commissioned by the Federal Ministry for Economic Affairs and Climate Action (BMWK) and implemented by GIZ, engages in a technical and political dialogue with Brazil, China, India, Indonesia and Mexico to reduce technical barriers to trade, enhance product safety and strengthen consumer protection. GPQI serves as a platform to improve the mutual understanding of policies and regulations and jointly develop positions and solutions for the international technical harmonisation of QI. Common bilateral interests are the basis for cooperation with various stakeholders on challenges and opportunities in standardisation, conformity assessment and accreditation, metrology and market surveillance. These stakeholders include ministries, regulators, public agencies, national standards and accreditation bodies, industry experts, associations, companies and technical and scientific institutions.

In the project context, the German-Indonesian Dialogue on QI is based on a Joint Declaration of Intent signed between BMWK and the Ministry of Industry of the Republic of Indonesia (MoI). GPQI aims to facilitate the dialogue between relevant actors in Germany and Indonesia to identify mutual interests and work together to address QI issues raised by any of the parties involved.

The underlying prerequisite of an efficient and solution-oriented dialogue is a common understanding of the role, scope and relevance of the essential QI elements and their systemic interaction in each country. Looking at another country's system from one's own perspective opens opportunities for insights and learning, as well as the chance to adopt and share inspiring practices. Dialogue also helps to find solutions to overcoming trade barriers, increasing product safety and enhancing environmental protection.

This comparative study of the Indonesian and German QI systems is therefore expected to contribute significantly to developing a mutual understanding of both systems. The study is informed by expert presentations and discusses the results of four designated exchange workshops between QI officials and experts from each country, held online between August 2022 and February 2023. Stakeholder interviews and literature research were additional sources of information and study input. The description of the German QI system benefited from a previously prepared study on the German QI system (BMWV, 2021).

Sections 2 and 3, describe the legal and regulatory basis for QI and the key QI components – standardisation, conformity assessment, accreditation, legal metrology and market surveillance – in each country. Section 4 elaborates on the general commonalities and differences between the countries and for each QI component. Section 4 also presents how each country addresses the latest developments and future trends, such as the relevance of QI for digitalisation, sustainable development and climate change.

The publication concludes with selected recommendations on what each country can learn and adopt from each other and how the dialogue should be continued.

1.3 Introduction to product case: electric motor

The example of an electric motor is used throughout Sections 2 and 3 to explain the practical importance of using quality infrastructure services in Indonesia and Germany. This product case poses relevant questions about each QI element and provides answers for each country, focusing on the industrial product: electric motor. The relevant questions include but are not limited to (BMWK, 2021):

- **How do I know which relevant legislation applies to my product?**
- **Where can I find standards to help meet the essential requirements?**
- **What conformity assessment services do I need to use, and how do I prove I used them?**
- **Is it essential that the conformity assessment body I used is accredited?**
- **Do I have to involve a notified body during conformity assessment?**
- **What will market surveillance authorities do if my product is dangerous?**

An electric motor is usually defined as a device that converts electric energy into mechanical energy through rotation. It is used to move objects in various industries, such as manufacturing, packaging or construction. Around 8 billion electric motors in the EU consume about 50 per cent of the EU's electricity generation. If the world is to combat climate change, it is therefore essential that we produce more efficient electric motors and promote their market uptake¹.

The example used in this study describes an electric motor used with low voltage (between 50 and 1,000 volts alternating current) and output between 750 watts and 7.5 kilowatts. This type of electric motor is not intended for use in vehicles or aircraft, nor in people's homes or particular environments, such as in explosive atmospheres or liquids. The product's Harmonised System (HS) code applied is 85 01 52.

Both countries produce, export, import and use this product in large quantities. Accordingly, standards and QI services are available and offered, particularly with regard to the quality and safety aspects of products manufactured in Indonesia and Germany/the EU, which is the particular focus of this study.

¹Electric motors and variable speed drives.
European Commission. (n.d.). 

2. The Indonesian Quality Infrastructure System



2.1 The legal and regulatory framework

Key points in this section:

- **Despite Indonesia's geographical fragmentation, the legal and institutional framework for quality infrastructure is established at the national level**
- **Indonesia has a formal overarching law that regulates standardisation, conformity assessment and national measurement standards, whereas legal metrology and market surveillance are each regulated under separate laws**
- **Standardisation and conformity assessment activities are based on strict and formal regulations**
- **Surveillance of goods is carried out at production sites, markets and customs areas**

Context

Indonesia is made up of nearly seventeen thousand islands, with 38 provinces and over 400 regencies and cities. For this reason, business and market regulations are implemented by layers of authorities at regional, provincial and national level. In principle, Indonesia adopts a holistic approach towards quality infrastructure. National quality infrastructure, which includes standardisation, metrology, testing, certification, accreditation and market surveillance, is a system that is expected to contribute to the policy of leveraging industrialisation, trade competitiveness in global markets, efficient use of natural and human resources, food safety, health, environment, as well as addressing aspects of climate change. This system applies to all products and services to ensure they meet requirements set by the competent authorities.

The legal and institutional framework for QI is established at the national level and in line with international agreements, including the World Trade Organization Agreement on Technical Barriers to Trade (TBT-WTO/TBT Agreement)². In practice, however, some QI activities are also implemented at local government level. The district government, for example, has responsibility for conducting market monitoring and reports its findings to the provincial government, which in turn forwards these to central government. In addition, legal metrology activities are also carried out at district/city level.

Indonesia's QI legal framework

QI operations in Indonesia have undergone a lengthy transformation. Initially, the requirements for standardisation and conformity assessment activities were regulated by various laws and regulations. Standardisation was regulated in Government Regulation No. 102/2000³ on National Standardisation, the scope of which was limited and insufficient to cover the rapid development of standardisation and conformity assessment activities.

² BSN - Badan Standardisasi Nasional. (2019, November 15). *Penggunaan "National Quality Infrastructure (NQI)" Oleh Regulator Untuk Mengurangi Hambatan teknis perdagangan thematic session - TBT WTO meeting, 12-13 November 2019*. BSN. [↗](#)

³ Government Regulation No. 102/2000: Standardisasi Nasional. [↗](#)

At present, Indonesia has one overarching QI law. This is Law No. 20/2014 on Standardisation and Conformity Assessment, which contains a provision for national quality infrastructure in the areas of standardisation, conformity assessment and national measurement standards.

The enactment of this comprehensive standardisation and conformity assessment law is in line with the recommendations of an international QI concept and was issued to provide coordinated, synchronised and harmonised QI arrangements that ultimately contribute to an increase in the effectiveness, efficiency and competitiveness of the national economy.

It also proves that standards and conformity assessments are of importance and significance to the Indonesian public. Law No. 20/2014 and its derivative regulation, Government Regulation No. 34 of 2018, mandates that standardisation and conformity assessment activities should aim to⁴:

a. improve quality assurance, production efficiency, national competitiveness, fair and transparent business competition, business certainty, capacities of business actors and capacities for technological innovation;

b. improve protection for consumers, business actors, the workforce, the general public and the country in aspects of safety, security, health and preservation of environmental functions;

c. improve the certainty, smoothness and efficiency of trade transactions for goods and/or services both domestic and international.

Other QI elements such as scientific metrology are also regulated under Law No. 20/2014⁵.

In addition to Law No. 20/2014, the laws and regulations governing other QI elements are as follows:

- Legal metrology is regulated under Law No. 2/1981⁶, which aims to ensure fair measurement using measuring instruments to measure the quantity and/or quality of products, conformity of labelling and the quantity of pre-packaged products.
- Law No. 8/1999 on Consumer Protection⁷ states that the authority to carry out surveillance of goods and/or services lies with the Government, the public and non-governmental consumer protection institutions.
- Product surveillance activities are carried out in factories, markets and customs areas.
- Product surveillance in the factory is regulated under Law No. 3/2014 on Industry⁸, Regulation of the Minister of Industry No. 25/2021 concerning Guidelines and Procedures for Industrial Supervision and Control⁹, and under Regulation of the Minister of Industry No. 45/2022 concerning Industrial Standardisation¹⁰.
- Product surveillance in customs areas is regulated under Law No. 17/2006 on Customs¹¹, and Regulation of the Director General of Customs and Excise, Ministry of Finance Number P-53/BC/2010 concerning Surveillance Procedures for the Directorate General of Customs and Excise¹².
- Furthermore, the legal basis for market surveillance of circulating goods and services in Indonesia is Law No. 7/2014 concerning Trade¹³.

The different areas of QI in Indonesia are implemented by different ministries and agencies, which will be explained in the following sub-section.

⁴ Law No.20/2014: Standardisation and Conformity Assessment

⁵ Law No.20/2014: Standardisation and Conformity Assessment. 

⁶ Law No. 2/1981: Legal Metrology. 

⁷ Law No. 8/1999: Consumer Protection. 

⁸ Law No. 3/2014: Industry. 

⁹ Regulation of The Minister of Industry, No. 25/2021: Guidelines and Procedures for Industrial Supervision and Control. 

¹⁰ Regulation of The Minister of Industry, No. 45/2022: Industrial Standardization. 

¹¹ Law No. 17/2006: Amendments to Law 1/1995: Custom. 

¹² Regulation of the Director General of Customs and Excise, Ministry of Finance Number P-53/BC/2010. 

¹³ Law No. 7/2014: Trade. 

2.2 The National Quality Infrastructure System in Indonesia

Key points in this section:

- **Development of the QI system in Indonesia is in line with international developments in the field, as can be seen from the commitment of Indonesian QI institutions to following global trends. To obtain international acceptance and recognition, every QI element is adapted to international developments**
- **The regulations define the key QI system actors and the responsible body for each QI element**

As stated in the section above, the basis for QI arrangements in Indonesia is Law No. 20/2014, which covers provisions on standardisation, conformity assessment (including accreditation) and national measurement standards. The relationship of these three elements and how they are used in Indonesia is illustrated in the figure on page 21.

The National Quality Infrastructure in Indonesia comprises the following set of activities¹⁴:

- a. development of standards, including planning, formulating, revising and maintaining Indonesian National Standards (SNIs);
- b. implementation of standards, including the voluntary and mandatory implementation of SNIs, as well as supervision and control towards the effectiveness of SNI implementation;
- c. conformity assessment procedures, including the administration of testing, inspection, certification, accreditation by conformity assessment bodies and traceability of conformity assessment results;
- d. accreditation to guarantee the competence of conformity assessment bodies (CABs), including the calibration laboratory;
- e. interaction between QI elements and stakeholders in operating the national quality infrastructure system.

Standards and conformity assessment (certification, testing, verification/validation and inspection) supported by accreditation and measurement (metrology) are key elements of the national quality infrastructure (NQI). Indonesia tailors its standardisation and conformity assessment system in line with the QI management system, which is recognised at international level. This is a fundamental way to increase global competitiveness and achieve the sustainable development goals. To obtain international acceptance and recognition, every QI element system must be aligned with international developments (Figure 2).

¹⁴Law No.20/2014: Standardisation and Conformity Assessment. 

Figure 1: The relationship between the main elements of NQI¹⁵

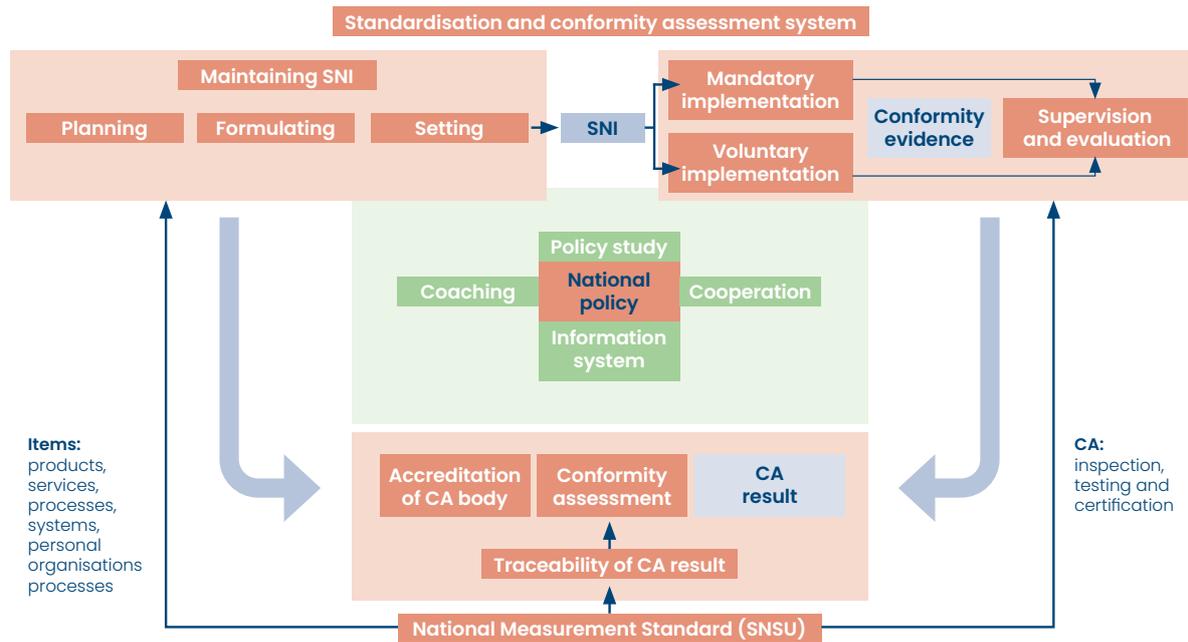
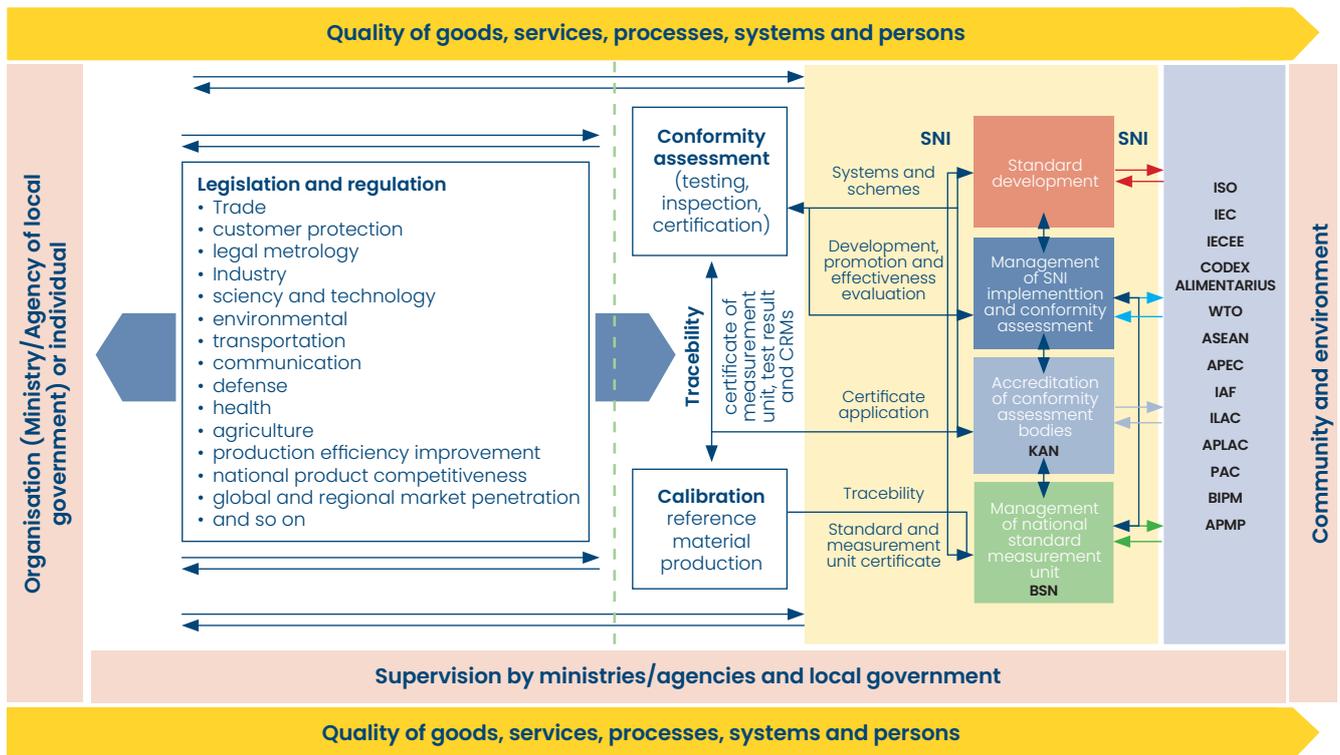


Figure 2: Standardisation system and national conformity assessment in Indonesia¹⁶



¹⁵ Faisal, Agah (2022). Role for Metrology in Indonesia, workshop material

¹⁶ BSN (2020). 2020-2024 Strategic Plans of National Standardization Agency

Table 1: Indonesian QI area

QI-area	Bodies
Standardisation and conformity assessment	National Standardization Agency of Indonesia (BSN)
Accreditation	National Accreditation Body (KAN)
Scientific metrology (national measurement standards)	Deputy of National Measurement Standards of BSN – (SNSU – BSN), the highest institute for scientific metrology
Legal metrology	Directorate of Metrology, Directorate General of Consumer Protection and Trade Compliance, Ministry of Trade
Product surveillance	<p>Pre-market surveillance: At production sites: Agency for Industrial Standardization and Service Policy (BSKJI), Ministry of Industry, At customs areas: Directorate General of Customs and Excise, Ministry of Finance</p> <p>Market surveillance: Directorate General of Consumer Protection and Trade Compliance, Ministry of Trade</p>

Key QI system actors in Indonesia

Standardisation (formulation of Indonesian National Standards/SNIs), conformity assessment, and national measurement standards are implemented under the responsibility of the National Standardization Agency (Badan Standardisasi Nasional – BSN), while accreditation for conformity assessment bodies (CABs) is carried out by the National Accreditation Body of Indonesia (Komite Akreditasi Nasional – KAN). The BSN is a non-ministerial government agency¹⁷ responsible to the President through a coordinating minister. KAN is a non-structural institution¹⁸ responsible to the President through the head of BSN. Furthermore, legal metrology implementation in Indonesia comes under the responsibility of the Directorate of Metrology, which answers to the Directorate General of Consumer Protection and Trade Compliance of the Ministry of Trade¹⁹.

Despite accommodating the national interest by taking into account innovation and technology

development and/or best available practices, SNI development also considers the availability of and harmonisation with international standards. To this end, BSN is a member of and actively participates in the International Organization for Standardisation (ISO), International Electrotechnical Commission (IEC), Codex Alimentarius Commission (CAC), Standards and Metrology Institute for Islamic Countries (SMIIC) and Pacific Area Standards Congress (PASC). Furthermore, KAN represents Indonesia in the context of international cooperation between accreditation bodies, namely the International Accreditation Forum (IAF), International Laboratory Accreditation Cooperation (ILAC) and Asia Pacific Accreditation Cooperation (APAC). Their aim is to establish mutual recognition agreements on the results of certification, testing, inspection, etc. which are commonly referred to as Multilateral Recognition Agreements (MLAs) or Mutual Recognition Arrangements (MRAs). BSN further promotes the recognition and/or acceptance of conformity assessment results conducted by other accredited conformity assessment bodies (CABs). Finally, it aims to reduce the cost of certification or duplicate testing, minimise technical trade barriers and also facilitate international trade. For scientific metrology, BSN is a member of the Bureau International des Poids et Mesures (BIPM) and Asia Pacific Metrology Programme (APMP).

¹⁷In Indonesia, there are several types of government agencies. Based on Law No. 39 of 2008 regarding state ministries, ministries work under and are responsible to the President. While non-ministerial government agencies work under and are responsible to the President through coordinating ministries.

¹⁸Non-structural institutions are institutions formed by Laws, Government Regulations or Presidential Regulations other than ministries or non-ministerial government institutions, financing of which is borne by the state budget. 

¹⁹MoT Regulation 29/2022

2.3 Components of the Indonesian Quality Infrastructure system

2.3.1 Standardisation

Key points in this section:

- **Development of the QI system in Indonesia is in line with international developments in the field, as can be seen from the commitment of Indonesian QI institutions to following global trends. To obtain international acceptance and recognition, every QI element is adapted to international developments**
- **The regulations define the key QI system actors and the responsible body for each QI element**

Overview of standardisation in Indonesia

In Indonesian regulations, standards are defined as technical requirements that are formulated based on a consensus between all parties and governments concerned involved and international decisions. Safety, security, health and environmental requirements, the development of science and technology, experience and current and future developments have been considered to achieve maximum benefits. Standardisation refers to the process of planning, formulating, setting, implementing, enforcing, maintaining and monitoring standards in an orderly manner and in cooperation with all stakeholders.

The Indonesian National Standard (SNI) is a standard set by BSN, which is applied in the territory of Indonesia²⁰. Data from 1988 to December 2022 shows that 14,611 SNIs were issued by BSN covering the following sectors: agriculture and food technology; construction; electronics, information and communication technology; engineering technology; public, infrastructure and science; health, safety and environment; material technology; specialised technology; food transportation and distribution.

Table 2: SNI statistics (1998 – December 2022)²¹

No.	An international classification for standards (ICS)	Valid SNIs	Abolished SNIs	Total SNIs
1.	Agriculture and food technology	2,498	584	3,182
2.	Construction	919	202	1,123
3.	Electronics, information and communication technology	674	22	700
4.	Engineering technology	1,772	329	2,128
5.	Public, infrastructure and science	847	150	1,017
6.	Health, safety, and environment	1,087	224	1,327
7.	Material technology	3,068	761	3,847
8.	Specialised technology	442	101	544
9.	Food transportation and distribution	535	206	743
Total		11,842	2,579	14,611

²⁰ Law No.20/2014: Standardisation and Conformity Assessment. [↗](#)

²¹ BSN (2022). Statistic SNI. [↗](#), accessed on March 6th 2023

The process of developing an SNI is always based on a consensus between the stakeholders (consumers, business actors, associations, experts, scholars and governments)²², and its application is voluntary²³. The SNI becomes legally binding when it becomes part of a contractual agreement between the parties or when it is mandatory as a result of technical regulations issued by ministries/government agencies in Indonesia. SNIs therefore have a crucial role in supporting technical regulations and building trust between customers and suppliers²⁴.

Law No. 20/2014 states that the principles in standardisation are consensus and impartiality, transparency and openness, effectiveness and relevance, coherence, a national development dimension, competency and traceability²⁵. These principles are in line with the Code of Good Practice of Annex 3 of the WTO TBT Agreement. These principles are applied so that the formulation of SNIs can be widely accepted by stakeholders. In international organisations, including ISO, BSN represents Indonesia as a member body in 287 technical committees (TC) (100 participating memberships and 187 observing memberships), and three Policy Development Committee (PDC) memberships (including the ISO committee for conformity assessment – ISO/CASCO, the ISO committee on consumer policy – ISO/COPOLCO, and the ISO committee on developing country matters – ISO/DEVCO).

Indonesia’s membership of the IEC forum in 2022 was recorded as a participating P-member in 22 TC/SC (technical committees and sub-committees) and an observing O-member in 46 TC/SC²⁷. The number of P members has increased compared with 2019, illustrating the growing importance of IEC standards for stakeholders²⁸.

The standards development process in Indonesia

Based on Presidential Regulation No. 4/2018 on the National Standardization Agency (BSN), BSN is responsible to the President. As a non-ministerial government institution, BSN activities are primarily financed by the state budget. This funding structure guarantees that standardisation remains a priority concern of the Government and is carried out according to market needs. When evaluating new proposals for standards, BSN cooperates with relevant experts to assess the public need for standards.

The formulation of standards is based on the National Programme for Standards Formulation (Program Nasional Perumusan Standar – PNPS) and is carried out in consideration of market needs and the effectiveness and efficiency of processing time. Furthermore, the process also considers the availability of resources, national interests, research findings, innovations and experiences.

Table 3: Indonesia’s membership in ISO²⁶

TC participation	100 participating memberships	187 observing memberships
PDC participation	3 participating memberships	

²² BSN Regulation No.8/2022. Guidelines for the Development of SNI.

²³ Government Regulation No 34/ 2018: Standardization and Conformity Assessment System

²⁴ Presidential Regulation No. 4/2018: National Standardization Agency.

²⁵ Law No.20/2014: Standardisation and Conformity Assessment.

²⁶ International Organization for Standardization. ISO. (n.d.) , accessed date 6 March 2023

²⁷ Indonesia. IEC. (n.d.). , accessed date 6th May, 2023

²⁸ 2019 annual report of BSN

The SNI development process begins with the submission of an SNI development proposal by a technical committee or stakeholders. In determining SNI development needs, the technical committee considers several factors, including priority sectors, urgent needs, availability of infrastructure support for standardisations, development of relevant bilateral and regional cooperation arrangements, development of standards at the international level, laws and regulations, trade value of products, and other pre-determined criteria. The BSN then assesses the proposal by considering:

- the urgency of the proposed SNI;
- main parties to benefit from the proposed SNI;
- the benefits of SNI implementation in respect of maintaining health, safety and environmental aspects and boosting the economy and competitiveness;
- the need for implementing SNIs as regulatory references for the Government;
- support from stakeholders;
- availability of conformity assessment bodies (CABs) to support SNI implementation;
- areas/scopes of proposed SNI that might possibly intersect with other technical committees.

If the proposal is accepted, it is then compiled in the form of a National Programme for Standard Formulation (PNPS) and stipulated by BSN with a period of one year as the priority scale for the SNI formulation programme. BSN will then submit the decision to technical committees to proceed with the SNI formulation process. At least once every six months,

BSN monitors the implementation of SNI formulation based on PNPS through an online page (<http://sispk.bsn.go.id>). Development of the SNI takes two different approaches²⁹:

- a. consensus-based – agreement on a standard design between stakeholders;
- b. based on scientific evidence – agreement on a standard design that is based on scientific proof.

A technical committee in BSN consists of a minimum of nine people, a maximum of 15 people and the number must be odd. It is made up of stakeholder representatives (covering the areas of business actors/associations, consumers, government and experts/academics in related fields). Management of the technical committee

Table 4: SNI development principles³⁰

Principle	Description
Transparent and open	The process is open to all parties interested in finding out about the SNI development programme and provides equal opportunities for those interested in participating.
Consensus-based and impartial	The process provides an opportunity for interested parties to express their views, accommodates agreements by these parties by consensus (majority vote) and does not take sides with certain parties.
Effective and relevant	The results must be made effective in accordance with the context of the needs.
Coherent	The process refers to relevant international standards to the fullest extent and avoids duplication with international standards formulation activities, so that the results are in harmony with international developments.

²⁹BSN (2021), BSN' regulation No. 8/2022: development of Indonesian national standards

³⁰BSN (2022). Regulation of the Head of BSN No.8/2022. Guidelines for the Development of SNI

Figure 3: SNI Development processes³³

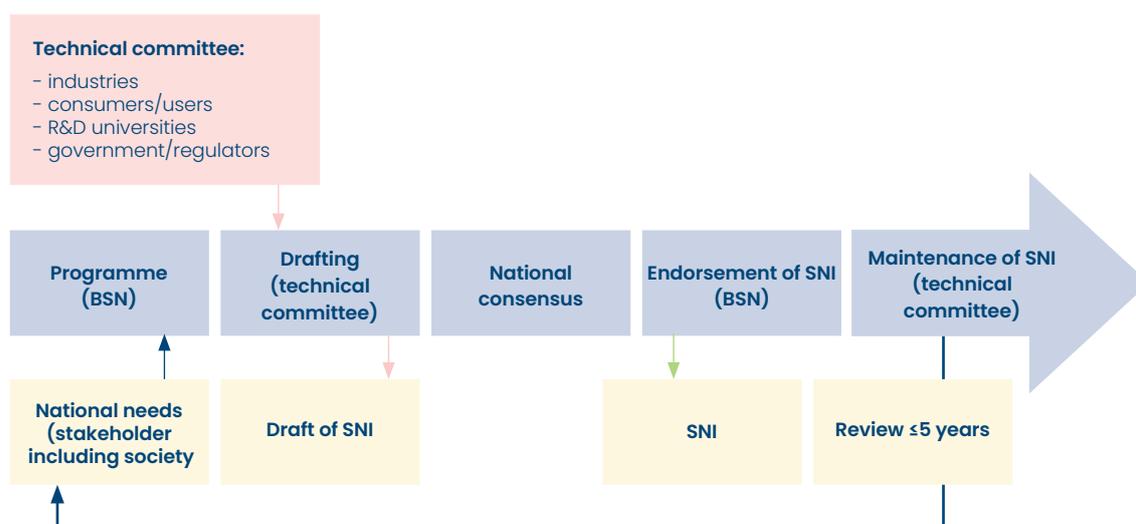


Figure 4: The SNI development process through urgent needs³⁴

Month to –	1	2	3	4
Stages				
Technical and consensus meeting	■			
Completion of draft of standards		■		
Public comments			■	
Designation and publication process				■
Standard criteria that can be submitted through the urgent stage: <ol style="list-style-type: none"> 1. Extraordinary circumstances 2. Natural disasters 3. National interest <ul style="list-style-type: none"> - statutory - order by presidential instruction - ministry/agency priority programs 				

is based on BSN Guideline No. 4/2018 concerning Guidelines for the Governance of Technical Committees. In Indonesia, more than 2,000 experts participate in 175 standards development technical committees³¹.

Once formulated by the technical committee, an SNI draft is then published on BSN's website to collect public opinion over a specified period, depending on the type of standard development. For regular SNI development (not identically adopted from any international standards), a public inquiry is conducted within one month. If an SNI is adopted from international standards, the public inquiry is scheduled for 14 days. And for SNI development based on urgent needs, the public inquiry process takes 14 days. Anyone can submit comments concerning the SNI draft online³².

³¹ Sistem Informasi standar Nasional Indonesia. BSN. (n.d.). [🔗](#)

³² BSN (2022). Regulation of the Head of BSN No.8/2022.

Guidelines for the Development of SNIs

³³ BSN Regulation No.8/2022. Guidelines for

the Development of SNI. [🔗](#)

³⁴ BSN Regulation No.8/2022. Guidelines for the

Development of SNI. [🔗](#)

At the end of the public inquiry, BSN reviews all responses given by stakeholders and decides on the findings. After finalisation, BSN will establish the SNI through the Head of BSN Decree. To ensure the relevance of the SNI issued, BSN will conduct a review at least every five years.

In view of the rapid development of technology, BSN determines standards criteria that can be submitted through urgent needs, including extraordinary circumstances, natural disasters and national needs (among other things, required by the laws and regulations, the President or priority programmes). Standard formulation through this track is faster than the normal process described above, since it requires a shorter time for public inquiry (14 calendar days). The comments received are compiled and the draft further processed for stipulation. This process takes ten calendar days in total.

An SNI is formulated in accordance with international standards, such as ISO and IEC, or standards issued by other standards development organisations (SDOs), including American Society for Testing and Materials (ASTM) and Japanese Industrial Standards (JIS). It does this in two ways:

- a.** Identical adoption of the standard by taking into account the national interest in facing global trade.
- b.** Modification of the standard by adapting it to meet differences in climate, environment, geology, geography, technological capability and other specific conditions (national differences).

To accommodate the national interest, an SNI may be formulated differently from international standards and those of other SDOs.

Adoption of international standards/other SDO standards to national standards can be achieved by taking one of the two approaches mentioned above. The aim of adoption is to increase market trust in SNIs, facilitate market penetration for business actors and also to accelerate the acceptance of SNI-marked products, the flow of SNI-marked products from producers to markets and the testing and certification of processes. In total, there were 13,048 SNIs by late 2019, of which around 50% were developed by adopting international standards/other SDO standards – either identically or with modification – so that they have the same level of conformity with international standards/other SDO standards (harmonisation)³⁵. SNI adoption from international standards is one of the stages of standards harmonisation, defined as an effective process for establishing substantially similar standards. Although there is still debate as to whether the aim of standards harmonisation offers greater convenience³⁶, this step at least provides the key to opening product acceptance to a wider market in the era of free trade.

³⁵BSN (2021) *The 2020–2024 Strategic Plans of National Standardization Agency*

³⁶Nasution, S.N. et.al. (2022). *Standar Nasional Indonesia terhadap Produk Barang dalam rangka Perdagangan Bebas WTO dan ACFTA*. Mahadi: *Indonesia Journal of Law*. Vol. 1, No. 2, August 2022

Case study: electric motor

The following table is a list of SNIs stipulated by BSN. In total, there are 17 SNIs relating to electric motors, with 15 SNIs identical to IEC standards. The application of identical or harmonious SNIs can increase acceptance and recognition, both nationally and internationally.

No	Standard	Title
1	SNI IEC 60034-1-2009	Rotating electrical machines - Part 1: Rating and performance
2	SNI IEC 60034-1-2013	Rotating electrical machines - Part 1: Rating and performance
3	SNI IEC 60034-2-1-2013	Rotating electrical machines - Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles)
4	SNI IEC 60034-2-2-2014	Rotating electrical machines - Part 2-2: Specific methods for determining separate losses of large machines from tests - Supplement to SNI IEC 60034-2-1 (IEC 60034-2-2:2010, IDT)
5	SNI IEC 60034-3-2009	Rotating electrical machines - Part 3: Specific requirements for cylindrical rotor synchronous machines
6	SNI IEC 60034-3-2013	Rotating electrical machines - Part 3: Specific requirements for synchronous generators driven by steam turbines or combustion gas turbines and for synchronous compensators
7	SNI IEC 60034-4-2014	Rotating electrical machines - Part 4: Methods for determining electrically excited synchronous machine quantities from tests (IEC 60034-4:2008, IDT)
8	SNI IEC 60034-6-2017	Rotating electrical machines - Part 6: Methods of cooling (IC Code) (IEC 60034-6:1991, IDT)
9	SNI IEC 60034-8-2015	Rotating electrical machines - Part 8: Terminal markings and direction of rotation (IEC 60034-8:2007, IDT)
10	SNI IEC 60034-9-2009	Rotating electrical machines - Part 9: Noise limits
11	SNI IEC 60034-11-2011 Edisi 2017	Rotating electrical machines - Part 11: Thermal protection (IEC 60034-11:2004, IDT)
12	SNI IEC 60034-14-2009	Rotating electrical machines - Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher - Measurement, evaluation and limits of vibration severity
13	SNI IEC 60034-22-2009 (2020)	Rotating electrical machines - Part 22: AC generators for reciprocating internal combustion (RIC) engine driven generating sets (IEC 60034-22:2009, IDT)

No	Standard	Title
14	SNI IEC 60034-30-1-2016	Rotating electrical machines - Part 30-1: Efficiency classes of line operated AC motors (IE code) (IEC 60034-30-1:2014, IDT)
15	SNI IEC 60034-31-2016	Rotating electrical machines - Part 31: Selection of energy-efficient motors including variable speed applications - Application guidelines (IEC/TS 60034-31:2010, IDT)
16	SNI 04-0918.17-2000	Rotating electrical machines - Part 17: Application guide for cage induction motor where fed from converters
17	SNI 04-1473-1989	Electric motor for industrial machinery, General rules

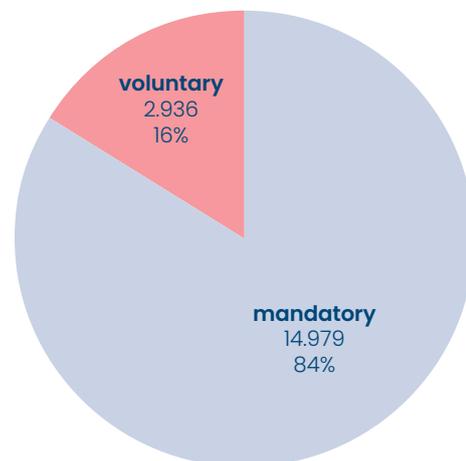
The process of implementing standards in Indonesia

Implementation of SNIs is basically voluntary. It is conducted by applying SNI requirements to goods, services, systems, processes or personnel. Proof of implementation is obtained through possession of a certificate of conformity. In accordance with Law No. 20/2014, business actors can apply standards through the certification process of an accredited conformity assessment body. After obtaining recognition in the form of a certificate and approval from BSN, business actors can use the SNI mark for services, systems, processes and personnel by affixing it to an identification board, letterhead or other media³⁷.

In the case of mandatory SNIs, determination of the SNI mark is carried out by the product certification body appointed by the authorised ministry/agency responsible for issuing the technical regulation for mandatory SNI application. Several important provisions are regulated, to ensure that business actors with approval for using SNI marks always comply with the stipulated conditions and do not affix an SNI number that differs from the certificate number.

In 2021, 17,915 products received SNI certification. Of these, 14,979 products received certification in the scope of mandatory SNI implementation and

Figure 5: Products with SNIs up to 2021³⁸



2,936 products were within the scope of voluntary SNI implementation. Furthermore, up to 2022 there have been 25,519 SNI certifications³⁹. To encourage the implementation of SNIs by business actors, including small and medium-sized enterprises (SMEs), BSN established a policy for the implementation of SNIs for bina-UMK, which is a mark to be used by SMEs to obtain a business permit (NIB) through the online single submission (OSS) system. OSS is an electronically integrated business permit issued by the Government for business actors through an integrated electronic system. This mark is intended specifically for SMEs whose business fields are included in the Standard Classification of Indonesian Business Fields (Klasifikasi Baku Lapangan Usaha Indonesia - KBLI) and is in the low-risk category. Up to 2022, a total of 145,936 products have received SNIs for bina-UMK⁴⁰.

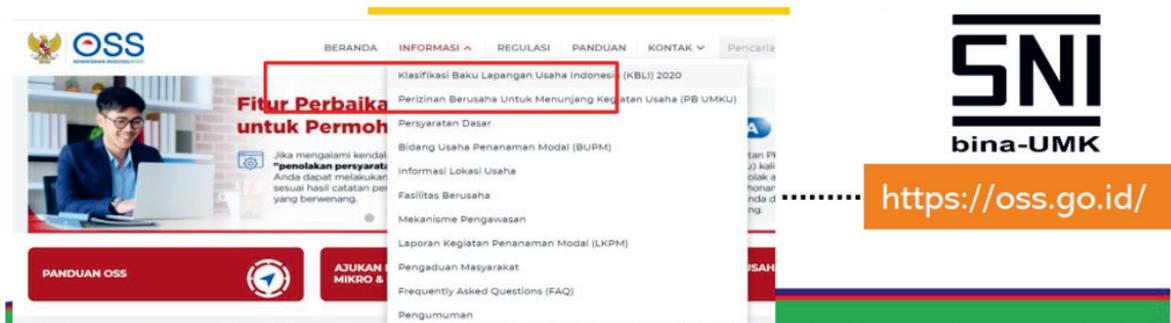
³⁷ Government Regulation No 34/ 2018: Standardization and Conformity Assessment System

³⁸ Annual Report of BSN (2021)

³⁹ Annual Report of BSN (2022)

⁴⁰ Annual Report of BSN (2022)

Figure 6: SNI mark for SMEs



Technical regulations based on SNI

The Government’s technical ministries/agencies can regulate the mandatory implementation of specific SNIs by issuing technical regulations. Products that do not comply with mandatory SNI provisions are prohibited from circulating in Indonesia.

Nevertheless, some mandatory SNI regulations stipulate exceptions for certain specific products such as special purpose products (for example test samples, products for research and development, and exhibition samples), as well as personal belongings⁴¹. Mandatory implementation of SNIs must be done with caution to avoid certain impacts, including obstacles to fair competition, delays to innovation and potential obstacles to SME growth.

The procedure for enforcing mandatory SNIs is stipulated in BSN Regulation No. 7/2020 on Procedures for Mandatory Implementation of SNIs⁴². Technical regulations are defined as documents stipulated by the ministry or authorised government agencies and containing characteristics of goods/services/methods/processes based on SNIs, other reference requirements, other standards, conformity assessment procedures and administrative requirements for which fulfilment is

mandatory by business actors. The first step is to identify the need for technical regulations by considering the problems encountered, the availability of SNIs, domestic and foreign trade conditions, as well as inputs from relevant stakeholders. Next, an analysis of the impact of regulations is carried out and the results are submitted to BSN prior to implementing the notification of technical regulations. As a result, the proposed programme is designated as the National Programme for Technical Regulations (Program National Regulasi Teknis – PNRT), which contains a list of proposed technical regulations based on good practices for the formulation and enforcement of technical regulations. BSN publishes PNRT for the upcoming one-year period through its website. The next step is the preparation and notification of technical regulations.

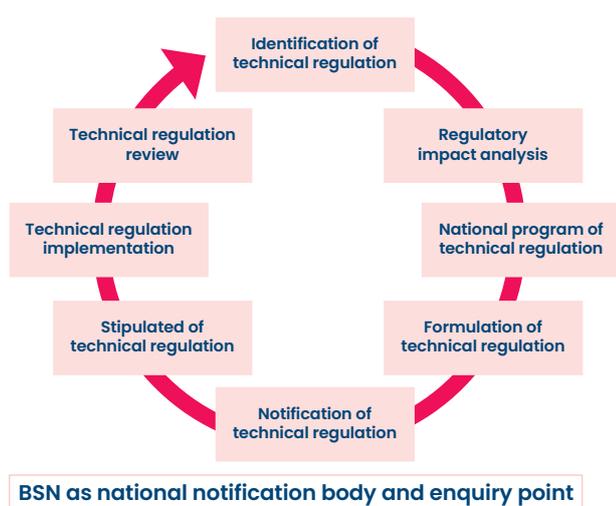
BSN must be informed of drafts for technical regulations from all ministries in order to fulfil international obligations and notify WTO. BSN assumes this function as Indonesia’s notification body for WTO TBT. After passing the notification stage, technical regulations are determined by the authorised government ministry or agency based on statutory regulations, with an effective enforcement period no earlier than six months after stipulation. The final step is the implementation stage for the technical regulations that have been set, followed by a review of technical regulations at least once every five years to ensure that goals are still being achieved effectively. A review of technical regulations is based on the following:

⁴¹Regulation of MoI No. 1/2021: the Compulsory Enforcement of Indonesian National Standards for Wheat Flour as Foodstuff

⁴² BSN Regulation No. 7/2020: Procedures for Mandatory Implementation of Indonesian National Standards.

- a change in circumstances that removes the need to enforce mandatory SNIs;
- the occurrence of an unanticipated impact that creates an obstacle to the development of business and trade;
- a change to or abolition of an SNI.

Figure 7: The framework for enforcing mandatory SNIs⁴³



The implementation of mandatory SNIs must be supported by surveillance, both pre-market surveillance to determine conformity of products with SNIs, and market surveillance to monitor and improve products in the market that do not meet SNI requirements.

Given that the implementation of technical regulations also applies to imported products, WTO member countries, including Indonesia, adopted the Agreement on Technical Barriers to Trade (TBT) and the Agreement on Sanitary and Phytosanitary Measures (SPS) in order to remove international trade barriers. Efforts to reduce trade barriers will work well if each country applies good regulatory practices. Some actions have been taken by Indonesia which are in line with WTO TBT principles. These include⁴⁵:

a. Non-discrimination principle

The principle of non-discrimination means equal treatment for imported products and similar local products. In national arrangements, based on Government Regulation No. 34/2018 on National Standardisation and Conformity Assessment

Table 5: The list of mandatory SNIs applied and referred to in regulations as of April 2023⁴⁴

Technical institution	Number of regulated SNI
Ministry of Industry	124
Ministry of Energy and Mineral Resources	88
Ministry of Public Works and Housing	44
Ministry of Trade	22
Ministry of Transport	9
Ministry of Marine Affairs and Fisheries	7
Ministry of Communication and Informatics	5
Ministry of Agriculture	2
National Cyber and Crypto Agency	1
Total	302

⁴³ BSN Regulation No. 7/2020: Procedures for Mandatory Implementation of Indonesian National Standards. [📄](#)

⁴⁴ BSN. (2022). The list of mandatory SNIs and/or SNI referred to in technical regulations. [📄](#) Update April 2023

⁴⁵ Nasution, S.N. et.al. (2022). Standar Nasional Indonesia terhadap Produk Barang dalam rangka Perdagangan Bebas WTO dan ACFTA. Mahadi: Indonesia Journal of Law. Vol. 1, No. 2, August 2022

Systems, all business actors have an obligation to obtain certification and attach the SNI marking for goods that have been subject to mandatory SNIs.

b. Transparency

Transparency means that each member country must provide notification when developing or implementing technical regulations, standards or conformity assessment procedures and must offer an opportunity for members to comment on each other's technical regulations, standards, and conformity assessment procedures. Implementation of the TBT Agreement requires an enquiry point and/or notification body to apply the principle of transparency. In Indonesia, BSN has a role in both matters.

c. Harmonisation

TBT establishes the principle of harmonisation. This means that every technical regulation, standard and conformity assessment procedure issued by a country must comply with international standards. Indonesia develops standards by referring to ISO, IEC, CAC when preparing normative regulations or policies. In an effort to fulfil this principle, Indonesia also participates in harmonising standards at regional level, i.e. the Association of Southeast Asian Nations (ASEAN). The work on standards in ASEAN is carried out through ASEAN Consultative Committee on Standards and Quality (ACCSQ) and its workings groups. One of the programmes proposed by ASEAN concerns the harmonisation of standards, with the aim of aligning each country's national standards through full or identical adoption of international standards.

d. The use of relevant standards

The TBT Agreement states that when a technical regulation is required by an industry and relevant international standards are already available, member countries must implement them or use relevant parts of those standards as the basis for formulating a technical regulation, unless the international standards or parts of those standards regulate information that are irrelevant due to climate or geographical factors, thus making them ineffective and less accurate for use as reference material.

Sanctions for violation

To enforce adherence to standards implementation, Law No. 20/2014 stipulates criminal sanctions and administrative sanctions⁴⁶. Criminal sanctions, such as sanctions in the form of district trials, will be imposed on those who commit crimes or violate existing laws and regulations. Administrative sanctions are penalties imposed for violations of statutory or normative regulations, such as withdrawal of goods, destruction of goods, revocation of business licenses, temporarily prohibiting the use of certificates, revocation of certificates and revocation of accreditation.

To ensure the smooth running of procedural activities, sanctions are imposed on business actors who commit violations or irregularities in accordance with the principles through Law No. 20/2014. Sanctions in respect of laws and regulations are imposed by special authorities and municipalities. For this reason, it is important to create synergies in various sectors between the Government and Indonesian citizens, beginning with the socialisation of regulations, improving community participation in the application and formulation of SNIs, developing a standards culture and reporting violations.

⁴⁶ Law No.20/2014: Standardisation and Conformity Assessment. 

2.3.2 Metrology and legal metrology

Key points in this section:

- **The metrology system in Indonesia is managed by two separate institutions, namely BSN for scientific metrology and the Ministry of Trade for legal metrology**
- **Legal metrology is regulated on the basis of Law No. 2/1981 and is associated with verification and re-verification of selected measuring instruments for length, volume, weight and their equipment by the Ministry of Trade**
- **Indonesia participates in several international and regional cooperation arrangements involving metrology institutions**

System of metrology in Indonesia

Metrology in Indonesia is currently organised by two technical institutions, namely the Deputy for National Measurement Standards under BSN for scientific metrology, and the Ministry of Trade through the Directorate General of Consumer Protection and Trade Compliance for legal metrology.

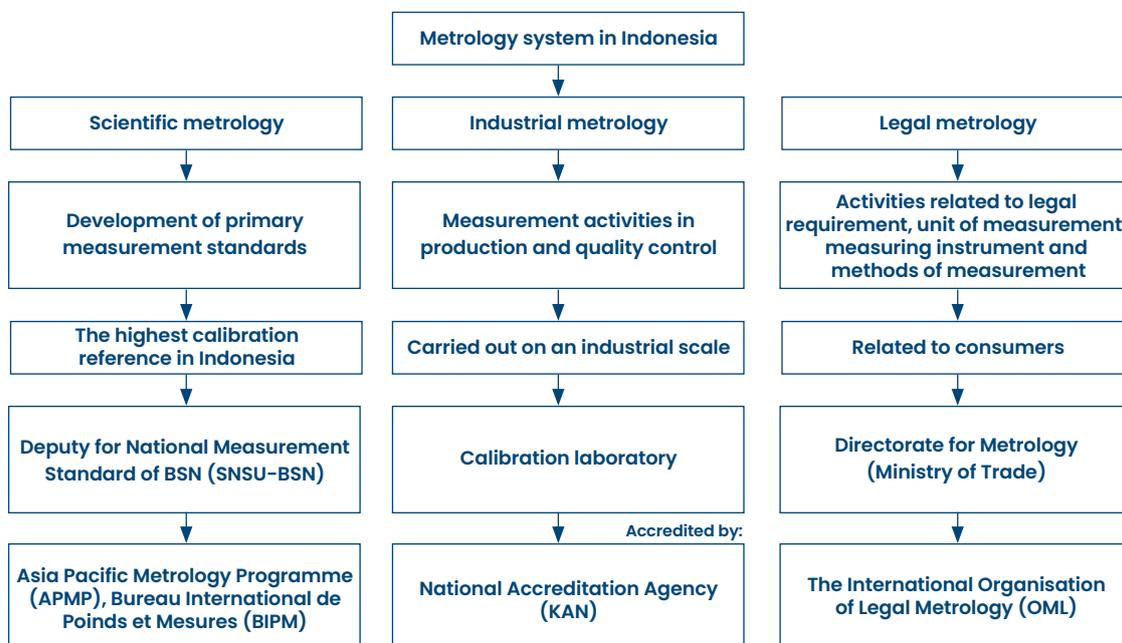
The National Measurement Standard is the highest standard reference for measurement in Indonesia. It is required to enable international recognition of the quality of goods and services produced by Indonesia.

The metrology system is divided into three, namely scientific, industrial and legal metrology⁴⁷.

Industrial metrology in Indonesia

Industrial metrology focuses on measurements in production and quality control. Common problems include calibration procedures and calibration intervals, control of measurement processes and management of measuring tools. Calibration

Figure 8: metrology system in Indonesia^{48, 49}



⁴⁷ Pusaka, J. (2006). Pembidangan Metrologi pada Lembaga Metrologi Nasional Luar Negeri. Jurnal Standardisasi. Vol. 8 No. 2

⁴⁸ Pusaka, J. (2006). Pembidangan Metrologi pada Lembaga Metrologi Nasional Luar Negeri. Jurnal Standardisasi. Vol. 8 No. 2

⁴⁹ Komala, et. Al (2014), Pengantar Standardisasi, BSN, ISBN : 978-602-9394-16-0

can improve the accuracy of measuring tools, while accurate measuring tools can improve product quality. Calibration activities should be conducted in a calibration laboratory, which issues the company or industry with a certificate for the equipment that has been calibrated. This calibration laboratory needs to be accredited by the National Accreditation Body (KAN). Certificates for testing laboratories and calibration laboratories issued by KAN have been recognized by countries in the Asia Pacific region because they already have mutual recognition agreements. As of January 2023, there are 192 calibration laboratories accredited by KAN in Indonesia⁵⁰.

Scientific metrology in Indonesia

Scientific metrology is the field of metrology that develops primary measurement standards or primary methods. Scientific metrology deals with general theoretical and practical problems

relating to units of measurement (for example the structure of a system of units or the conversion of units of measurement in formulas), errors in measurement, problems relating to the metrological properties of applying measuring instruments and the development of primary measurement standards or primary methods⁵¹. National measurement standards/scientific metrology in BSN is conducted on the basis of Presidential Regulation No. 4/2018. This includes the integration of national measurement standard management into the BSN organisational structure to strengthen functions and increase synergy between elements of the national quality infrastructure. Indonesia currently has 146 calibration and measurement capabilities (CMCs) and has participated in 66 international comparisons, which evaluate the capabilities of a tool to be used as a globally recognised standard for calibration and measurement⁵².

Table 6: Number of Indonesian and German CMCs as of December 2022⁵³

Metrology area	Abbreviation	Number of CMCs	
		Indonesia	German
Acoustics, Ultrasound, Vibration	AUV	27	52
Electricity and Magnetism	EM	24	186
Length	L	8	103
Mass and related quantities	M	33	190
Photometry and Radiometry	PR	0	95
Chemistry and Biology	QM	4	451
Ionizing Radiation	RI	0	239
Thermometry	T	41	117
Time and Frequency	TF	9	25
Total		146	1458

⁵⁰ Calibration Laboratory Client Directory. [↗](#)

⁵¹ Komala, et. Al (2014), Pengantar Standardisasi, BSN, ISBN : 978-602-9394-16-0

⁵² Number of key comparisons by state or economy. [↗](#)

⁵³ CMC statistics. [↗](#)

Table 7: Number of approved CMC proposals⁵⁴

Year	Number of CMCs	
	Indonesia	Germany
2011	0	141
2012	15	71
2013	0	255
2014	0	9
2015	11	24
2016	0	34
2017	12	77
2018	30	15
2019	16	113
2020	20	46
2021	16	78
2022	0	64
Total	120	927

One of the activities of the National Measurement Standard is to prepare policy formulation and implementation of a measurement traceability system. To improve the traceability of national measurements to the international system of units, infrastructure facilities must be provided as tools for calibration and measurement systems. This is achieved by procuring standards tools to increase the capacity of the traceability system and at the same time maintain the quality of services provided.

To gain international recognition for CMCs, SN-SU-BSN carries out a series of activities geared to developing and maintaining laboratory facilities, and also implements a quality management system based on the ISO/IEC 17025 standard. In addition, recalibration is carried out at metrology institutes in other countries to ensure that laboratory equipment uses the highest standards.

Legal metrology in Indonesia

Legal metrology includes all activities relating to the legal requirements for measurement, units of measurement, measuring instruments and measurement methods. The purpose of legal metrology is to fulfil public interest by protecting consumers and guaranteeing that produced goods meet the specified standards of size and quality. Legal metrology ensures the legitimacy of measurements by providing order and legal certainty in the use of measurement units.

The legal basis for legal metrology in Indonesia is Law No. 2/1981. The institution responsible for managing the legal metrology system in Indonesia is the Ministry of Trade through the Directorate General of Consumer Protection and Trade Compliance. The implementation unit is the Directorate of Metrology.

As stated in Law No. 2/1981, legal metrology is associated with instruments for measuring in particular length, volume and weight and ancillary equipment. Before being imported or produced in Indonesia, all measuring instruments must already have type approval according to Government Regulation No. 29/2021. Once measuring instruments have type approval, the measuring instruments must be verified and re-verified in line with Minister of Trade Regulation No. 67/2018.

Verification is carried out by performing tests on unused measuring equipment. Based on the test results, the measuring equipment will be marked with valid or invalid verification marks or provided with a written statement including valid or invalid verification marks. Meanwhile, re-verification is carried out by performing tests on calibrated measuring equipment. Based on the test results, the measuring equipment will be affixed with periodical marking of valid or invalid verification marks or provided with a written statement including valid or invalid verification marks. As mentioned in Article 3 (1) of the Regulation, verification and re-verification is mandatory for measuring instruments which are directly or indirectly used or stored in a ready-to-use condition for the purpose of determining measurement results for⁵⁵:

⁵⁴ CMC statistics. 

⁵⁵ Regulation of Minister of Trade No. 67/2018. 

- a. public interest
- b. business
- c. handing or receiving goods
- d. determining retribution or payment
- e. determining the end products in a company
- f. implementing laws and regulations.

Verification activities include inspection, testing and verification marking⁵⁶. Inspection is a series of actions prior to testing that assess the type and kind of measuring instrument in accordance with technical requirements, while testing is the overarching action that compares the designation value with a standard size to determine metrological properties in line with technical requirements. The Legal Metrology Unit at the Regency/Municipal Office organises the verification and re-verification of measuring instruments to ensure compliance with legal metrology. Verification and re-verification must be conducted on (a) domestically manufactured measuring

equipment, and (b) measuring equipment that is imported prior to being offered, sold, leased, delivered or held as stocks. Verification activities can be carried out at (a) a technical implementation unit or legal metrology unit, (b) other laboratories, (c) the location of permanently installed measuring instruments, (d) importers' warehouses for imported measuring instruments, or (e) the factories of domestically manufactured measuring instruments. Re-calibration can be performed at (a) a technical implementation unit or legal metrology unit, (b) other laboratories, (c) the location of permanently installed measuring instruments, (d) the location for re-verification sessions outside a technical implementation unit or legal metrology unit, or (e) anywhere measuring instruments are used⁵⁷.

The table below shows measuring equipment that is subject to mandatory verification and re-verification under MoT Reg No. 67/2018:

Table 8: List of measuring instruments subject to mandatory verification and re-verification

No.	Measuring instrument
1.	Wood meter
2.	Length meter
3.	Non-automatic level gauge: <ul style="list-style-type: none"> a. Depth tape b. Ullage Temperature Interface (UTI)
4.	Automatic level gauge <ul style="list-style-type: none"> a. Capacitance level gauge b. Radar level gauge c. Ultrasonic level gauge d. Float level gauge e. Servo level gauge f. Electromagnetic level gauge
5.	Taximeter
6.	Parking meter
7.	Dosage <ul style="list-style-type: none"> a. Dry dosage b. Wet dosage
8.	Car measuring tank for oil-fuelled cars.
9.	Upright cylinder permanent measuring tank

⁵⁶ Regulation of Minister of Trade No. 68/2018. 

⁵⁷ Regulation of Minister of Trade No. 67/2018. 

Table 8: List of measuring instruments subject to mandatory verification and re-verification

No.	Measuring instrument
10.	Barge measuring tank
11.	Ship measuring tank
12.	Automatic scale a. Running tyre scale b. Weighing in motion c. Railweight bridge
13.	Non-automatic scales a. Non-automatic scales with automatic reference: 1) Class II, III and IV electronic scale, 2) spring scale, 3) quick scale b. Non-automatic scales with semi-automatic reference (rapid quick scales) c. Non-automatic scales with non-automatic reference 1) balance scale, 2) steelyard scale, 3) millesimal scale, 4) centesimal scale, 5) decimal scale, 6) edging weight scale, 7) Beranger scale
14.	Moisture meter
15.	Fuel dispenser
16.	Liquified petroleum gas dispenser
17.	Gas fuel dispenser
18.	Fuel oil flow meter and the following products: a. Positive displacement meter b. Turbine flow meter c. Mass flow meter
19.	Gas meter: a. Rotary piston gas meter b. Turbine gas meter c. Diaphragm gas meter
20.	Water meter with 254 mm diameter nominal (DN)
21.	Electricity active energy meter (meter kWh): a. Class 2 or (A) and Class 1 or (B) kWh meters b. Class 0.5 or (C) and Class 0.2 or (D) kWh meters

Legitimate mark of verification results

Verification marking arrangements are regulated in Minister of Trade Regulation No. 125/2018. A verification mark is a sign affixed and/or attached to a measuring instrument or to a written statement stating the validity of that measuring instrument after testing. A legal mark is a sign that is affixed or attached to a measuring instrument or to a written statement stating that a measuring instrument meets technical requirements at the time of verification or re-verification.

Legal marks are issued annually and show two Arabic numerals which denote the last two digits of the year in line with Minister of Trade Regulation No. 69 of 2021 on legal marks for 2022. The legal marks for 2022 are used for the verification and/or re-verification of measuring instruments in 2022. The period for affixing and/or installing legal marks for 2022 was from 1 January 2022 to 31 December 2022.

Figure 9: (a) Legal mark for verification results (b) Legal mark for verification results in 2022

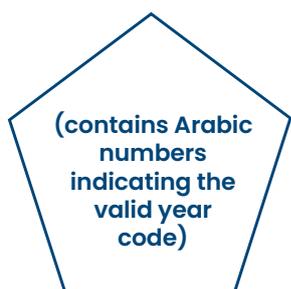


Figure 9 (a) ⁵⁸



Figure 9 (b) ⁵⁹

International participation and cooperation of Indonesia

As the National Metrology Institute of Indonesia, SNSU-BSN is a member of the Asia Pacific Metrology Programme (APMP) and a member of the General Conference on Weights and Measures (CGPM) – BIPM in Paris, France. All measurements worldwide must be traceable to measurement standards managed by BIPM. Both organisations hold a routine meeting annually to discuss scientific and technological developments in the field of metrology, determine definitions for measurement units and conduct mutual recognition agreements. SNSU-BSN also obtains international recognition of national measurement and calibration capabilities through active participation in the ASEAN Expert Group on Metrology (EGM) and the Standards and Metrology Institute for Islamic Countries (SMIIC). SNSU-BSN participates in various activities organised by these metrology organisations, a form of the general assembly, technical commission meeting, metrology commission meeting and interlaboratory comparison (ILC).

Through the Directorate of Metrology, Indonesia is an active member of the International Organization of Legal Metrology (OIML), which develops international recommendations, especially those relating directly to trade, and seeks to align and harmonise various legal metrology requirements globally. OIML also operates the OIML

certification system (OIML-CS), which facilitates the international acceptance and global trade of regulated measuring instruments. OIML-CS is a system for issuing, registering and using OIML certificates and related OIML-type evaluation/test reports for types of measuring instruments (including measuring tool groups, modules or groups of modules), based on the requirements of OIML recommendations. OIML's mission is to support economic activities by putting in place an effective, mutually compatible and internationally recognised legal metrology infrastructure, for all areas under the Government's responsibility. This in turn facilitates trade, builds mutual trust and harmonises levels of consumer protection worldwide. Currently, 63 countries are registered as OIML member⁶⁰.

The Directorate of Metrology is also active in regional metrology bodies, including the Asia Pacific Legal Metrology Forum (APLMF) and Working Group on Legal Metrology under the ACCSQ (WG 3). Participation at the ASEAN level aims to align legal metrology requirements between ASEAN Member States (AMS) and strengthen ASEAN cooperation at relevant international forums. The Working Group on Legal Metrology in ASEAN works to ensure all regulated measuring instruments (including supermarket scales, fuel dispensers, taximeters, water and electricity meters) in the ASEAN region are fit for use, traded and for other purposes based on the International Organization of Legal Metrology recommendations. ASEAN cooperation on legal metrology aims to facilitate the removal of technical barriers to trade associated with legal metrology, in order to realise the ASEAN Economic Community⁶¹.

⁵⁸ Regulation of the Minister of Trade No. 125 of 2018: Calibration Marks

⁵⁹ Regulation of the Minister of Trade No. 69 of 2021: Legal Mark of 2022

⁶⁰ OIML member states  - accessed January 2023

⁶¹ ASEAN Secretariat. (n.d.). ASEAN Guidelines for the Verification of Fuel Dispensers. 

Mutual Recognition Arrangement (MRA)

The International Committee for Weights and Measures – International Bureau of Weights and Measures (CIPM – BIPM) focuses on establishing the Mutual Recognition Arrangement (MRA)⁶², which is a framework for joint acceptance of measurements made by member countries of the Meter Convention. Under this arrangement, SNSU-BSN and other national metrology institutions undergo peer reviews at regional and international level to provide approval for their calibration and measurement capabilities. CIPM meets twice a year (since 2011) at the BIPM and discusses reports submitted by each of the consultative committees under CIPM. Reports from CIPM meetings, along with other reports from CIPM and the consultative committee are published by BIPM.

After successfully completing the review/research/development process, the National Metrology Institute (NMI) can register relevant technical information about calibration and measurement capabilities in the CIPM-BIPM online global database. These CMCs are the basis for acceptance of measurement results by metrological institutions internationally. The CIPM MRA is open to NMI member countries, NMI associate countries and economies, and certain international organisations invited by CIPM. There are currently 251 agencies that participate in the CIPM MRA, including 97 NMIs, four international organisations and 150 designated institutions⁶³. Currently, BSN has entered into an MRA with the Asia Pacific Metrology Programme (APMP) as a regional metrology organisation and the BIPM as an international metrology organisation. The results of measurements or calibrations performed by SNSU-BSN are therefore accepted in all APMP and BIPM member countries.

Case study: electric motor

The characteristics of an electric motor must be determined according to its function and taking into account such aspects as continuous function, frequent starting and braking with reverse current and high-inertia machines requiring a precise slip (e.g. a press motor). Electric motor manufacturers must pay attention to the no-load moment and minimum moment during start-up, the maximum required moment, the normal moment in continuous operation, the possibility

of overload, the frequency of starting and braking and the change in a moment with time. None of these things can be separated from measurement. Many manufacturers carry out self-testing using test kits that have been calibrated by an accredited calibration laboratory. Ultimately, electric motor manufacturers can benefit from measurement results that are traceable to international measurement standards.

⁶² CIPM Mutual Recognition Arrangement (CIPM MRA). 

⁶³ CIPM MRA participants. BIPM. (n.d.). , accessed January 2023

2.3.3 Conformity assessment and accreditation

Key points in this section:

- **Conformity assessment activities provide confidence in product quality and safety**
- **BSN establishes conformity assessment schemes to facilitate conformity assessment activities**
- **Accreditation provides assurance for the competence of conformity assessment bodies (CABs)**
- **The National Accreditation Body of Indonesia (KAN) is a professional, independent and impartial accreditation body for CABs and carries out its activities in accordance with international standard ISO/IEC 17011**

General overview of conformity assessment activities in Indonesia

Together with standardisation, conformity assessment has an important role in ensuring consumer trust in the market as well as protecting their safety and the environment. This compliance may involve conformity assessments that are mandatory or voluntary in nature. Similar to the development of SNIs, which was described in the previous sub-section, conformity assessment activities must also comply with the following rules⁶⁴:

- a. openness – activities do not limit parties seeking to become a conformity assessment body (CAB);
- b. transparency – any requirements and processes implemented can be accessed and traced by stakeholders;
- c. impartiality and competence – to ensure the trustworthy conduct of conformity assessment activities;
- d. effectiveness – by considering market needs and applicable statutory regulations;
- e. coherence and convergence/alignment with the development of conformity assessment at international level.

In facilitating voluntary conformity assessment activities, BSN determined 270 conformity assessment schemes covering 875 SNIs prior to March 2022⁶⁵. As a minimum, these schemes include requirements in the standards or regulations, administrative procedures, types of conformity assessment activities, evidence of conformity and supervision by government agencies. Products (goods and services), systems, processes, or personnel that have met the specified reference requirements are then given evidence of conformity in the form of certificates of approval for the use of SNI marks/Surat Persetujuan Penggunaan Tanda SNI (SPPT SNI). SPPT SNI is the basis of approval for using conformity marks, i.e. SNI marks. Furthermore, consumers can obtain information about SNI products through a website-based application, Si Barang ber-SNI (Bang Beni), which can be accessed at <https://bangbeni.bsn.go.id/>

⁶⁴ BSN. (2017). Penilaian Kesesuaian. 

⁶⁵ Sagala, K (2022) – Material Workshop QI

Voluntary standards

Conformity assessment is carried out by a **CAB accredited by KAN** in the appropriate scope. If an accredited CAB in the appropriate scope is not yet available, **BSN may appoint a CAB** based on requirements in the provisions of the law. The CAB may carry out conformity assessment for a maximum period of two years⁶⁶.

Conformity assessment activities in Indonesia are performed by a CAB, which is a legal entity in compliance with Indonesian laws and regulations that has been accredited by KAN. Accreditation is conducted to certify the technical competence and objectivity of conformity assessment, where the ultimate goal is to ensure that conformity assessment bodies and the activities they perform can be trusted. Regardless of whether conformity assessment is mandatory or not, gaining this trust is crucial to address consumer needs in terms of the quality of products, systems, processes and personnel.

As part of conformity assessment, testing is carried out in laboratories that have implemented ISO/IEC 17025. The application of ISO/IEC 17025 can be proven through (a) accreditation by KAN, or (b) accreditation by an accreditation body signing mutual recognition in the APAC and ILAC forum, or (c) if there is no accredited laboratory according to points (a) and (b), then the test can be carried out at the applicant's laboratory or a laboratory selected by the product certification body by ensuring the competence, suitability and impartiality of the testing process⁶⁷. For mandatory SNIs in particular, conformity assessment procedures are carried out through designation schemes, both for product certification bodies and testing laboratories. For example, the Ministry of Industry stipulates Regulation No. 20/2020 concerning the Mandatory Implementation of Indonesian National Standards (SNIs)

Mandatory standards

The appointment of **CABs for mandatory standards is regulated by the technical ministry** e.g. regulated areas in the industrial sector: the minister may appoint CABs that are not yet accredited in the appropriate scope under certain conditions, including if the accredited CAB in the appropriate scope is not yet available.

on Paper and Cartons for Food Packaging. The conformity assessment schemes for said product are further regulated by Minister of Industry No. 56/2020 concerning Conformity Assessment Bodies in the Context of Mandatory Implementation and Supervision of SNIs of Paper and Cartons for Food Packaging. This regulation stipulates five appointed product certification bodies and five appointed testing laboratories. Thus, manufacturers of paper and cartons for food packaging who distribute their products in the territory of Indonesia must obtain an SNI mark in accordance with this regulation.

Proof of conformity

The implementation of standards is carried out by applying requirements to goods, services, systems, processes or personnel and compliance is proven by obtaining the SPPT SNI mark. The results of conformity assessment become the basis for approval to use the SNI mark or conformity mark. In order to provide additional information regarding the application of an SNI, SNI marks can be displayed with certain attributes. This may be in the form of:

- a registration number;
- additional marks and/or statements to

demonstrate compliance with aspects of safety and performance and/or fulfilment of other aspects regulated in the conformity assessment scheme.

Inclusion of the SNI mark refers to Regulation No. 2 of 2017 concerning Procedures for Using SNI Marks and SNI-based Conformity Marks⁶⁸, issued by the Head of the National Standardization Agency.

⁶⁶ Article 54 of Government Regulation No. 34/2018

⁶⁷ Skema Penilaian Kesesuaian Terhadap Standar Nasional Indonesia Sektor Elektroteknika, Telekomunikasi, Dan Produk Optik diunduh:



⁶⁸ BSN Regulation No. 2/2017: Procedures For Using SNI Marks And SNI-Based Conformity Marks.

Figure 10 (a) SNI marks (conformity assessment based on SNI), (b) Timber Verification and Legality System (SVLK) conformity assessment mark based on regulations



(a)



(b)

The SNI mark is a certification mark provided by BSN to state that a product or service has met SNI requirements. In the case of mandatory SNI application, approval to use the SNI mark may be regulated by the technical ministry that issued the technical regulation. This mark then guarantees that the quality of goods indeed meets the standards imposed in Indonesia. This guarantees the rights and safety of consumers who consume these goods. Furthermore, SNI also protects the rights and determines the obligations of a business actor who may be the manufacturer or distributor of the product.

The application of SNIs to products will make it easier and more convenient for consumers to find the products they need. This is also an added value for producers, since they will have quality assurance for the goods they produce and distribute, thereby increasing their market penetration. For these reasons, it is highly recommended for business actors to use SNI as a quality reference for every product they produce.

One example of a conformity mark based on regulations is the Timber Legality Assurance System (SVLK), established by the Ministry of Environment and Forestry, the function of which is to ensure that wood products and the origin of raw materials are managed in line with legal requirements. SVLK is a system developed to ensure a product's credibility by guaranteeing the legality and traceability of forest products and the sustainability of

forest management. Timber is declared legal if its origin, transport, process and trade – as well as the permits, systems and procedures for its logging – are proven to meet all requirements. This is just one of Indonesia's efforts to ensure the legality of timber and its products is consistent with the global timber market. Forest yields and forest products that have met the standards of sustainability, legality and declaration provisions can be affixed with the SVLK marks⁶⁹.

Accreditation in Indonesia

Accreditation activities in Indonesia are regulated by Law No. 20/2014, which designated KAN as a non-structural institution that carries out duties and responsibilities on behalf of the Government in the accreditation of CABs. KAN is responsible to the President through the Head of BSN. KAN is operated in accordance with ISO/IEC 17011 requirements⁷⁰ and represents Indonesia as a full member of the international cooperation forums of accreditation bodies such as the IAF, ILAC and APAC. The accreditation granted by KAN to CABs is proven in the form of a certificate of recognition, testing, inspection and others.

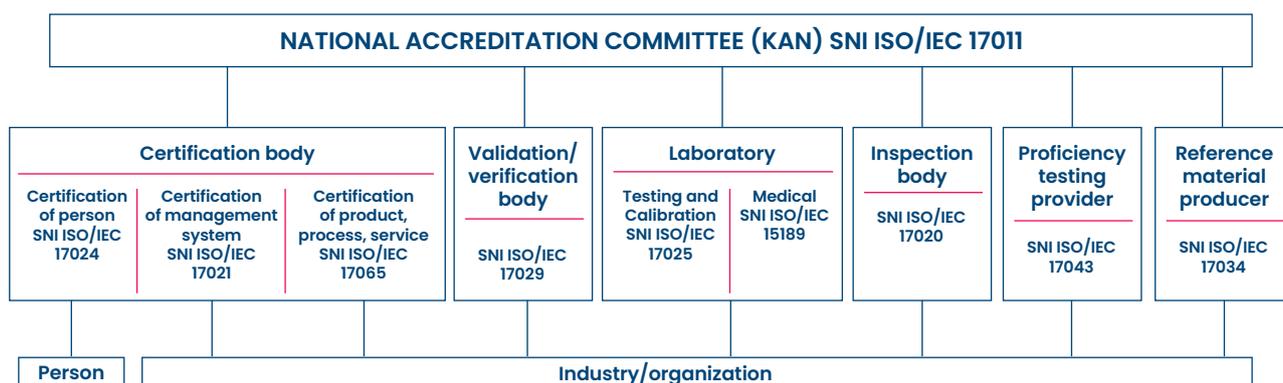
Within KAN, there is a body called the KAN council, which is made up of 70% private representatives and 30% Government representatives. This council is responsible for setting strategies/policies and making decisions on CAB accreditation.

As a member of the IAF, KAN is a signatory to the IAF MLA for quality management system certification (since 22 September 2002), environmental management system certification (since 26 October 2007), product certification (since 19 October 2009), food safety management system

⁶⁹ The Decree of the Ministry of Environment and Forestry (2021), stipulation of the SVLK mark

⁷⁰ History and function of KAN. 

Figure 11: National accreditation system in Indonesia



certification (since 21 October 2015), personnel certification (since 26 October 2018), information security management system certification (since 21 June 2019), energy management system certification (since 21 June 2019), and Food Safety System Certification (FSSC) 22000 certification (since 1 November 2021). As a member of ILAC, KAN is also a signatory of ILAC MRA for testing laboratories (since 20 June 2001), calibration laboratories (since 30 December 2003), inspection bodies (since 24 October 2012), and medical laboratories (since 14 March 2013⁷¹).

A CAB that has been accredited by KAN can use the accreditation symbol. This may only be affixed in the correct shape, size and position, as specified in the established guidelines⁷². The accreditation of testing and calibration laboratories is relevant to trade activities. Hence, the ideal is to avoid re-testing the same products/parameters by having the calibration certificates or testing reports acknowledged in another country, or by obtaining accreditation from a certification body whose management system and product certificates can be recognised by the export destination country.

In some sectors, mutual recognition of product certificates is essential. Mutual recognition is playing an increasingly important role in accreditation. Data as of 22 October 2022 show that a total of 2,730 CABs have been accredited by KAN^{73 74}. Most of these are unable to enter into mutual recognition agreements individually with their partners around the world. Being recognised worldwide with just one accreditation is much simpler, easier and less expensive to achieve and maintain. This requires a streamlined accreditation structure to facilitate mutual recognition agreements.

At the national level, the accreditation scheme must be properly designed to be consistent with priority sectors and interests and to encourage increased utilisation of the scheme. To facilitate trade and ensure the acceptability of the national accreditation system at the international level, it is vital to continuously maintain programmes of mutual recognition. Continuous improvement of national accreditation services is essential to produce innovative, effective and efficient services.

⁷¹ International Recognition.

⁷² Law No.20/2014: Standardisation and Conformity Assessment.

⁷³ Raharjo, S (2022) – Material workshop QI

⁷⁴ National Accreditation Body (www.kan.or.id), 2022

Case study: electric motor

According to SNI IEC 60034-1-2013, electromagnetic compatibility (EMC) for electric motors requires rotating electric machines with a rated voltage of not more than 1000 V and 1500 V, for operation in an industrial environment. The electronic components that are installed inside a rotating electric machine and are essential to its operation are part of the machine. Several requirements for final propulsion systems and their components (for example, electronic equipment for power and control, coupled engines, monitoring devices, etc., whether installed inside or outside of machines) are not included in the scope of this standard. One of the requirements for EMC testing on electric motors is an emission test, performed by conducting a typing test based on CISPR 11, CISPR 14 and CISPR 16 according to their application. Emission tests of electric motors for brushless engines must comply with the radiated and conducted emission limits of CISPR 11 class B, group 1 (Table B.1 in the standard). Meanwhile, the emission test for electric motors for brushed machines, if tested under load, must comply with the radiated and conducted emission limits (if a load is

applied) and must meet the requirements of CISPR 11, class A, group 1 (Table B.2 in the standard).

In order for the results of the tests carried out by the CAB to be recognised and accepted by all stakeholders, the CAB must be accredited by an accreditation agency that has received international recognition – in Indonesia this is KAN.

One form of cooperation arrangement held in the ASEAN region is the Sectoral Mutual Recognition Arrangement for Electrical and Electronic Equipment (ASEAN EE MRA) and the ASEAN Harmonized Electrical and Electronic Equipment Regulatory Regime (AHEEERR) which was developed as a means of facilitating cooperation to provide benefits for industry, trade and Conformity Assessment Body (CAB) ASEAN electrical and electronic equipment sector through the EEE Joint Stock Company's achievements in minimising technical obstacles through harmonisation of standards, mutual recognition cooperation and harmonisation of technical regulation⁷⁵.

⁷⁵ BSN – Badan Standardisasi Nasional. (2017, November 16). ASEAN EE MRA Dan Aheeerr Diharapkan mampu memberikan Manfaat Bagi Industri, Perdagangan Dan lembaga Penilai Kesesuaian. BSN. 

2.3.4 Market surveillance and product safety

Key points in this section:

- **Market surveillance ensures compliance with standards and conformity assessment implementation**
- **Market surveillance system in Indonesia includes the legal basis, institution and division of authority**
- **Other types of surveillance also covered in this part are public and community surveillance, which may have their own type of sanctions**

Market surveillance ensures the compliance of standard implementations according to regulations

The role of a market surveillance authority is to supervise the market closely and instruct manufacturers to withdraw or recall products that are dangerous or not in compliance with regulations. Thus, surveillance becomes a very important aspect of quality infrastructure in Indonesia, on account of its crucial responsibility for ensuring the security, safety and health of people. Consumer protection is a supporting condition in achieving a conducive economy and vital in striking a balance between protecting the interests of consumers and business actors. Ideally, consumer protection must be preventive in nature and occur before consumers can suffer from losses resulting from the consumption of goods and/or services circulating in the market either from domestic or imported sources.

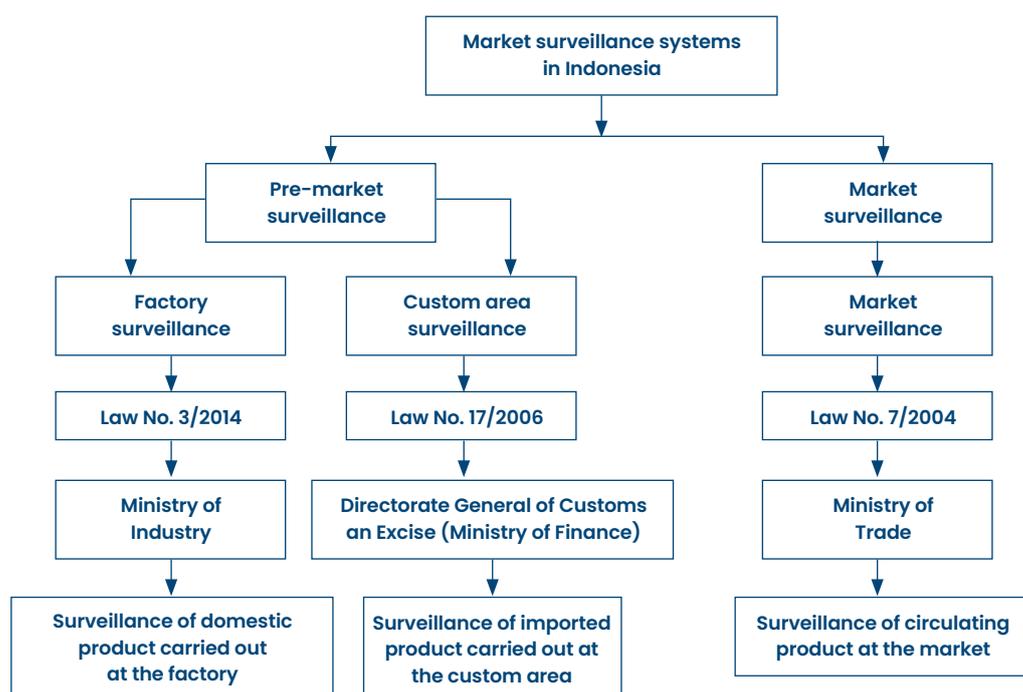
The Government issued the Regulation of the Minister of Trade No. 69/2018 concerning the Surveillance of Circulating Goods and/or Services⁷⁶ to protect consumers throughout the territory of the Republic of Indonesia. Market surveillance also benefits business actors, providing protection against unfair competition from other business actors who do not comply with the rules and required standards.

Market surveillance system in Indonesia

Market surveillance in Indonesia is carried out by multiple institutions and depends on the origin and type of product as well as provisions in the regulations. In general, surveillance consists of pre-market and market surveillance. Pre-market surveillance is the mechanism to determine that a good and/or service meets provisions included in the technical regulations before distribution to the market. For domestic products, pre-market surveillance is carried out at the factory by the Ministry of Industry, and for imported products at customs by the Directorate General of Customs and Excise (Ministry of Finance). Market surveillance is a mechanism for monitoring goods or services used by consumers or circulating in the market to check their compliance with the provisions of technical regulations. Market surveillance is carried out by the Ministry of Trade for products circulating in the Indonesian market.

⁷⁶ Regulation of the Ministry of Trade No. 69/ 2018: Surveillance Circulating Goods and/or Services. 

Figure 12: Market surveillance system in Indonesia⁷⁷



Pre-market surveillance

The essence of pre-market surveillance is to check compliance of goods or services with conformity assessment requirements in technical regulations. Conformity with standards requirements in technical regulations can be identified with a conformity certificate and/or the affixing of a conformity mark. The application of conformity assessment does not differentiate between domestic and foreign producers, nor between the origin of the goods or services. CABs are required to carry out monitoring and supervision of certificated goods or services to ensure consistency in meeting standards requirements; if these are not met, the conformity assessment body that issued the certificate of SNI/conformity must take corrective action, including the freezing or revocation of certificates.

Pre-market surveillance by Mol is carried out on both voluntary and mandatory SNI implementation, technical specifications and guidelines of procedure. For voluntary SNI implementation, the Mol may request the conformity assessment body (CAB) to submit a report regarding the

certificate of conformity that has been issued and conduct a conformity test randomly in the factory. For mandatory SNI implementation, technical specifications and guidelines of procedure, the Mol conducts document verification, an inspection of the production process and quality control at the factory. Pre-market surveillance is carried out using two mechanisms, namely regular surveillance and special surveillance. Regular surveillance is carried out based on a predetermined surveillance plan. Special surveillance is carried out on the basis of reports from the public, business actors and/or related agencies and evaluations of import data and/or commodity balances. In Indonesia, surveillance at provincial, regency and city level is carried out by the local governmental agency responsible for the sector of industry and trade.

Surveillance in customs areas is coordinated by the Directorate General of Customs and Excise (DJBC) – Ministry of Finance. DJBC set up a customs control post as a place to monitor the traffic of imported and exported goods. A customs area is an area marked by specific boundaries at sea-ports, airports or other places designated for the movement of goods. DJBC balances its functions

⁷⁷ Regulation of the Ministry of Trade No 69/ 2018: Surveillance Circulating Goods and/or Services.

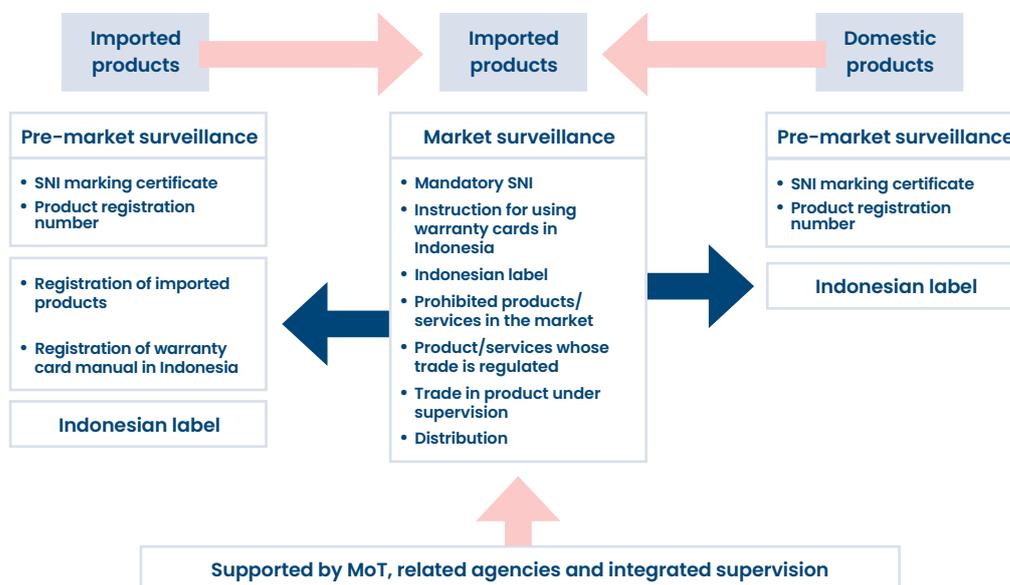
as a trade and industry facilitator, customs revenue collector and community protector. Surveillance is carried out on product traffic to prevent the entry of products that may endanger the interests, safety, security and health of the public as consumers or the preservation of environmental functions, or that are detrimental to or do not meet established standards. Based on Law No. 17/2006, DJBC has a responsibility to supervise the import of products that require mandatory SNIs, which are stipulated in technical regulations.

Market surveillance

In Indonesia, market surveillance activities are carried out as soon as technical regulations on mandatory standards implementation are enacted, in order to control unfair competition among business actors and protect consumers. Market surveillance is the responsibility of the Government.

Surveillance of goods and services circulating in Indonesia is currently carried out by the Directorate of Supervision of Circulating Goods and Services, Ministry of Trade. The legal basis for its implementation is Law No. 7/2014 concerning Trade. Furthermore, the Ministry of Trade of the Republic of Indonesia stipulates Regulation No. 36/2018, which states that the authority to monitor goods circulated at the local level is within the remit of the local government, while the ministry is responsible for monitoring at the national level. Reporting on supervisory activities is carried out in stages, from district to provincial and then to national level. In carrying out supervision, the Ministry of Trade coordinates with relevant technical agencies and working units in the province and/or district/city regional governments⁷⁸. Surveillance in border areas is carried out by taking into consideration surveillance parameters, particularly standards, labels and guarantee card manuals.

Figure 13: The surveillance mechanism for circulating goods⁷⁹



⁷⁸ Regulation of the Minister of Trade No. 69/2018 Concerning Surveillance of Circulating Goods and/or Services

⁷⁹ BKPERDAG - Badan Kebijakan Perdagangan. (n.d.). Laporan Hasil Analisis. BKPERDAG.

In accordance with Minister of Trade Regulation No. 69 of 2018⁸⁰, three types of market surveillance are carried out – periodic, special and integrated surveillance. Periodic surveillance is carried out within a certain timeframe, based on the priority of goods and services to be monitored. This activity is carried out periodically in accordance with a predetermined programme based on the criteria set out in the regulation. These include surveillance for dangerous goods, securing the domestic market, cases of fraud or forced selling, or simply to implement the provisions set down in relevant laws and technical regulations.

Special surveillance is carried out from time to time, based on the findings of violation indications reported by the consumer or complaints received from the public, the Non-Governmental Consumer Protection Agency (LPKSM), information from printed and electronic media or as a follow-up to other information received regarding goods or services. Integrated surveillance is carried out by means of a programme or, where there is a problem that requires effective and coordinated handling, with other relevant technical agencies. Integrated surveillance is carried out by the Ministry of Trade by forming an integrated team.

The scope of market surveillance for circulating goods covers compliance with standards, Indonesian-language labels, instructions for use, after-sales service guarantees, selling methods, advertisement and principles clauses. Meanwhile, the scope of market surveillance for services encompasses standards, guarantees or assurances, advertisement, sales methods and principles clauses. The objects of market surveillance are:

- a. circulating goods that are subject to mandatory SNI and/or technical requirements;
- b. circulating goods affixed with a voluntary SNI marking;⁸¹
- c. inclusion of the Product Registration Number (NRP) or Goods Registration Number (NPB) on goods and/or packaging in accordance with legal provisions;
- d. ownership of a copy of the SNI marking certificate;
- e. services that are subject to mandatory SNIs, technical requirements and/or compulsory qualifications;
- f. services affixed with voluntary SNI mark, compliance with technical requirements and/or voluntary qualifications.

Public and community surveillance

The legal basis for public and community surveillance is Law No. 8/1999 concerning Consumer Protection. Article 30 of the law states that surveillance of the implementation of consumer protection and its relevant laws and regulations are carried out by the Government, the public and non-governmental consumer protection organisations. Surveillance by the public and non-governmental consumer protection agencies is carried out on goods and services circulating in the market, based on statutory regulations. The results of this surveillance may be communicated to the public, relevant business actors and the Government, so that any follow-up action necessary can be taken. The surveillance can be done through research, testing and/or surveys. Surveillance aspects should contain information on the risks of consumption, as required, affixing of labels, publicity material and other requirements based on the relevant laws, regulations and business practices.

⁸⁰ Regulation of the Ministry of Trade No 69/ 2018: Surveillance Circulating Goods and/or Services. 

⁸¹ Regulation of the Ministry of Trade No 69/ 2018: Surveillance Circulating Goods and/or Services. 

Case study: electric motor

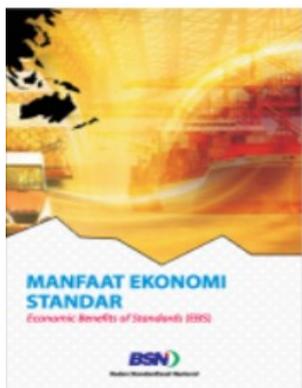
In Indonesia there are no regulations regarding market surveillance specifically for electric motors. However, even though not mentioned directly, electric motors are the main component of energy-using equipment.

Regulation of the Minister of Energy and Mineral Resources of the Republic of Indonesia No. 14/ 2021: Application of Minimum Energy Performance Standards for energy-using equipment, defines the Minimum Energy Performance Standards (MEPS) which must be applied by domestic producers and importers to be traded in the region Indonesia. The implementation mechanism works through inclusion of the MEPS mark or energy efficiency label. In this regulation, supervision is carried out on (a) the inclusion of the MEPS mark/energy efficiency label; (b) conformity of the MEPS mark printed on products with energy performance; and (c) conformity of the energy efficiency label attached to products with energy performance. MPES assessment is carried out by testing products on the market by the Director General, who has the authority and coordinates with relevant parties or agencies. For imported goods, supervision is carried out once they leave the customs area. In addition,

domestic producers and importers must periodically report every three months on the brand, type, capacity and quantity of energy-using equipment produced and/or imported. Any domestic producer/importer who commits a violation and fails to submit a report will be subject to administrative sanctions. One example of a product included in this scheme is a fan (Decree of the Ministry of Energy and Mineral Resources Number 114.K/EK.07/DJE/2021).

Furthermore, through Minister of Energy and Mineral Resources Regulation No. 7/2021, the Government also requires the mandatory implementation of SNI 7859:2013 (Household Electrical Equipment and the Like - Safety - Part 1: General requirements (IEC 60335-1:2010, MOD) and SNI 7609:2011 (Household Electrical Equipment and the Like - Safety - Part 2-80: Special requirements for fans). The obligation to comply with the SNI is enforced by affixing the SNI mark and/or safety mark to products produced domestically, in ASEAN member countries or originating from imports, in accordance with the trade product classification code. As with other regulations, supervision is carried out by sampling products circulating in the market by the Director General, who has authority independently or in collaboration with the relevant agencies.

2.4 Further reading on Indonesian QI



Manfaat ekonomi standar: Economic benefits of standards (EBS) (2015)

This book presents a very comprehensive discussion on standards and conformity assessment, the economic theory of standardisation, analysis of economic benefits, calculation of the benefits and economic costs of standardisation, and is complemented by the results of a study on the benefits of standardisation from an economic perspective. The contents are essential reading for scientists, businesses, governments, manufacturers, suppliers and traders, as well as consumers, the general public and all those wishing to gain a general understanding of the economic benefits of standards.

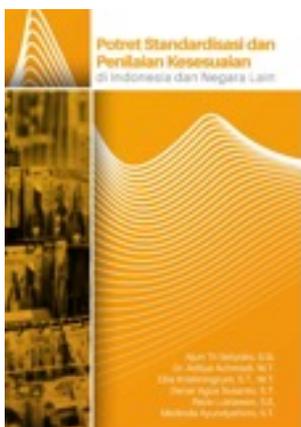
Authors: Carunia Mulya Firdausy, Sunarya, Teguh Pribadi Adi Nugroho, Ida Busneti
Publisher: National Standardization Agency for Indonesia (BSN)
ISBN/ISSN: 978-602-9394-18-4
Available here: [↗](#)



Introduction to Standardisation (Pengantar Standardisasi): Second Edition (2014)

This book is structured to serve as the main reference for studying standardisation at the tertiary level. This book is a refinement of its first edition, based on input from various parties, particularly academics who used the first edition as a reference for developing the standardisation curriculum. This book sets out the three main pillars that support national competitiveness: standardisation, conformity assessment and metrology.

Authors: National Standardization Agency For Indonesia (BSN)
Publisher: National Standardization Agency for Indonesia (BSN)
ISBN/ISSN: 978-602-9394-16-0
Available here: [↗](#)



Portrait of Standardisation and Conformity Assessment in Indonesia and Other Countries (Potret Standardisasi Dan Penilaian Kesesuaian Di Indonesia Dan Negara Lain) (2020)

This book provides readers with an overview of standardisation and conformity assessment activities, from their origins to standardisation implementation in Indonesia. This book provides information on the management of standardisation and conformity assessment activities, including on the national standardisation authorities, standards development organisations and accreditation bodies in Indonesia and other countries, such as Malaysia, Singapore, Thailand, China, Korea, United Kingdom, Germany and America.

Authors: Ajun Tri Setyoko, Aditya Achmadi, Ellia Kristiningrum, Dinar Agus Susanto, Reza Lukiawan, Meilinda Ayundyahrini
Publisher: Dee publish
ISBN/ISSN: 978-623-02-1458-5
Available here: [↗](#)



3. The German Quality Infrastructure System

3.1 The legal and regulatory framework

Key points in this section:

- **The EU's harmonised Quality Infrastructure (QI) system is founded on the success of the European Single Market**
- **European harmonised standards are an integral part of the EU's regional QI system**
- **In 2008, the EU introduced the New Legislative Framework (NLF), which combines applicable EU legislation and harmonised standards. The NLF is applicable in all EU Member States, including Germany**
- **Trade and market regulation competencies are shared between EU, federal and state levels in Germany**
- **Germany has no overarching QI law, but an accreditation law, a metrology law and a standardisation agreement**

Context

The Federal Republic of Germany is a federal state and a founding member of the European Union. Germany comprises 16 federal states at the sub-national level. The trade and market regulation competencies are shared between three levels (regional, national and sub-national). The competencies for regulating the European Common Market and international trade lie with the European Union. The 16 federal states are responsible for implementing market surveillance, while the German Government mainly fulfils a coordinating function.

The legal and institutional frameworks focusing on QI are shaped not only at the national level but also in line with the EU and international agreements, e.g. as part of technical harmonisation of the single European market and under the Agreement on Technical Barriers to Trade (TBT) administered by the World Trade Organization (WTO)⁸².

In the area of technical regulations, the framework of the European Common Market is authoritative. The harmonised QI system in the EU is a crucial foundation of the success of the European Single Market. European citizens can rely on equally high product standards across the EU. Manufacturers declare their products' conformity with the legal EU product requirements only once, not in each Member State individually. Market surveillance authorities exchange information on regional communication platforms and risk alert systems. Developing European standards is integral to the EU's harmonised QI system. A harmonised standard is a European standard developed by a recognised European standards organisation: CEN, CENELEC or ETSI. It is created following a request from the European Commission to one of these organisations. Manufacturers, other economic operators or conformity assessment bodies can use harmonised standards to demonstrate that products, services or processes comply with relevant EU legislation. The references of harmonised standards must be published in the Official Journal of the European Union (OJEU). Manufacturers issue declarations of conformity using the familiar CE mark – with or without the involvement of a third party, depending on the EU legislation applicable. The CE mark has legal significance.

⁸² Germany and the European Union are both WTO members since 1995.

German QI's legal framework

As a member of the EU, Germany does not have an overarching QI law. Instead, German QI's legal framework comprises various laws, regulations and agreements that regulate the functioning of the fundamental QI system, including its components for standardisation, metrology and accreditation under the legal umbrella of the EU. In the field of metrology, the Measures and Verification Act (MessEG, Mess- und Eichgesetz)⁸³ defines the requirements for measuring instruments to ensure precise and accurate measurement results. The Accreditation Body Act (AkkStelleG, Akkreditierungsstellengesetz)⁸⁴ transposes the EU regulation stipulating the existence of only one accreditation body per Member State into national law. The necessity for having specific legislation on accreditation is mainly because each EU Member State needs to define how to establish a national accreditation body. Due to the voluntary nature of standardisation, there is no national legal basis for standards development, but instead a contractual agreement between the national standards bodies DIN and DKE (as independent organisations) and the German Government (Standards Agreement of 1975)⁸⁵.

Strengthening the EU single market for goods: the New Legislative Framework

The EU introduced the New Legislative Framework (NLF) in 2008. The NLF is a set of legal acts to complement and strengthen the EU's approach to product legislation in the single market. The NLF applies the proven method that prescribes only essential requirements reflected in basic EU product legislation and voluntary harmonised standards. Unlike many other countries or regions globally, there are no mandatory standards in the EU unless standards are directly referenced in laws or private contracts. The NLF strengthens EU

legislation's overall coherence and consistency, the notification process, accreditation, conformity assessment procedures and market surveillance.

3.2 National Quality Infrastructure system

Key points in this section:

- **Germany does not have a formalised, overarching quality policy or a formal QI coordinating body**
- **Germany's Quality Infrastructure has developed organically and widely**
- **German QI institutions, especially PTB and DIN, are global pioneers in their fields**

in Germany

Germany is one of the leading export nations. The world-famous attribute 'Made in Germany' promises quality and indicates entrepreneurial spirit. Upholding and modernising an infrastructure that safeguards and expands a high level of quality is a key mission of German economic and technology policy.

Germany does not have a formalised, overarching quality policy or a formal QI lead body. Even though predecessor organisations of the German National Metrology Institute (Physikalisch-Technische Bundesanstalt, PTB), the German Institute for Standardization (DIN) and the German Commission for Electrical, Electronic & Information Technologies (DKE) have operated for more than a century⁸⁶, the term quality infrastructure (QI) is still relatively new in the German context and was introduced through QI-related development cooperation work.

The Federal Ministry for Economic Affairs and Climate Action (BMWK) has a coordinating role, the legal framework is primarily shaped at the European level and applies in Germany through

⁸³ Gesetz über das Inverkehrbringen und die Bereitstellung von Messgeräten auf dem Markt, ihre Verwendung und Eichung sowie über Fertigpackungen. MessEG - nichtamtliches Inhaltsverzeichnis. (n.d.). 

⁸⁴ Gesetz über die Akkreditierungsstelle (Akkreditierungsstellengesetz - akkstellleg). AkkStelleG - Gesetz über die Akkreditierungsstelle. (n.d.). 

⁸⁵ DIN - Deutsches Institut für Normung. (n.d.). 

⁸⁶ PTB's predecessor organisation, the Physikalisch-Technische Reichsanstalt (PTR), was founded in Berlin in 1887 on the initiative of Werner von Siemens and Hermann von Helmholtz. DIN continues the work of the Standards Committee of German Industry (NADI), founded in 1917.

Figure 14: Elements of quality assurance infrastructure⁸⁷

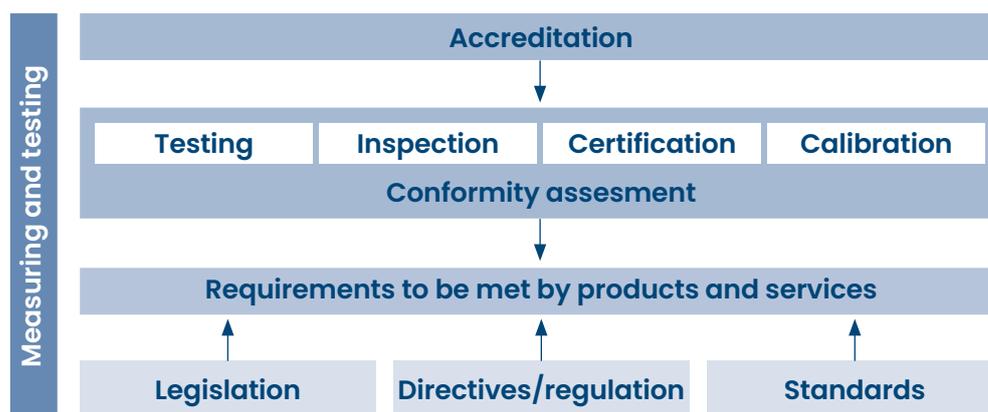


Table 9: Germany’s leading QI institutions

QI area	Bodies
Standardisation	DIN (general) and DKE (electrical, electronic & information technologies): private, non-profit
Accreditation	DAkKS (‘one accreditation body per economy’): private, non-profit, entrusted by the German Government
Metrology	National Metrology Institute of Germany (PTB): federal institute, the highest institution for scientific, industrial and legal metrology; federal state agencies for verification and municipalities Designated institutes BAM, German Federal Office of Consumer Protection and Food Safety (BVL) and the German Environment Agency (UBA)
Market surveillance	National Metrology Institute of Germany (PTB): federal institute, the highest institution for scientific, industrial and legal metrology; federal state agencies for verification and municipalities

Germany’s membership of the European Union. In addition, the German federal states have many functions through the federal system in matters of technical regulations, legal metrology and market surveillance.

The quality infrastructure institutions in Germany, in particular PTB, DIN and DKE, are among the global pioneers in their fields. Due to the German economy’s export strength, the country’s quality

infrastructure has developed organically and widely. Currently, the QI institutions are involved in developing industrial policy areas of the future, including digitalisation, Industry 4.0 and the circular economy. In these new areas, the institutions rely on their scientific excellence and the active participation of the private sector.

The PTB’s International Department carries out projects to strengthen QI in developing and emerging countries on behalf of the Federal Ministry for Economic Cooperation and Development (BMZ).

⁸⁷ BMWK – Federal Ministry for Economic Affairs and Climate Action. (n.d.). Elements of quality assurance infrastructure. BMWK.

Key QI system actors in Germany

Key QI actors in Germany are the German Institute for Standardization (DIN), the German Commission for Electrical, Electronic & Information Technologies in DIN and VDE (DKE), the German national accreditation body DAkkS and the market surveillance authorities at federal and state level. In addition, the Federal Institute for Materials Research and Testing (BAM), the Federal Network Agency (BNetzA) and the PTB operate under the purview of BMWK.⁸⁸ Experts from companies, associations, academia and other interested parties participate in DIN and DKE standardisation committees and QI dialogues at European and international level.

3.3 Components of the German Quality Infrastructure

3.3.1 Standardisation

Key points in this section:

- **Developing and using standards is voluntary by nature**
- **Technical regulations are legally binding prescriptions to be applied by all market actors**
- **As standards are voluntary, governments avoid turning standards into mandatory regulations**
- **If a country opts for deregulation, working with standards can facilitate the deregulation process**
- **DIN and DKE are the recognised national standards bodies in Germany**
- **The principles of standardisation in Germany are defined in DIN 820**
- **SPECS are fast-track standards developed in times of rapid technological change or societal or economic emergencies**
- **Germany's standardisation system is closely linked to the respective European and international systems**
- **The European Commission uses harmonised European standards to help specify 'how' a product or process ought to be, thus defining technical requirements**
- **Standardisation strategies rely on future foresight techniques**

⁸⁸ In addition, there are further (notifying) authorities relevant for the German QI system that operate under other ministries.

Definitions and principles

The development and use of standards is voluntary by nature. Standards should be developed by those who consider them relevant, advantageous and necessary for market access and success. These are private-sector actors in the first place. Standardisation is based on consensus and driven by markets – two fundamental principles of standards development. The recognised standards bodies in Germany, DIN and DKE, apply a wider array of principles, including openness, broad participation, benefits for society and elimination of technical trade barriers.⁸⁹ The principles of standardisation in Germany are defined in DIN standard 820. These principles align with the Code of Good Practice for Standards Development of the WTO⁹⁰.

Conversely, technical regulations are legally binding prescriptions and must be applied by all economic actors in a market. Technical regulations are developed by the public sector, notably ministries and other public authorities, who are mandated to develop regulations. Technical regulations pursue protection targets, usually regarding safety, health and the environment.

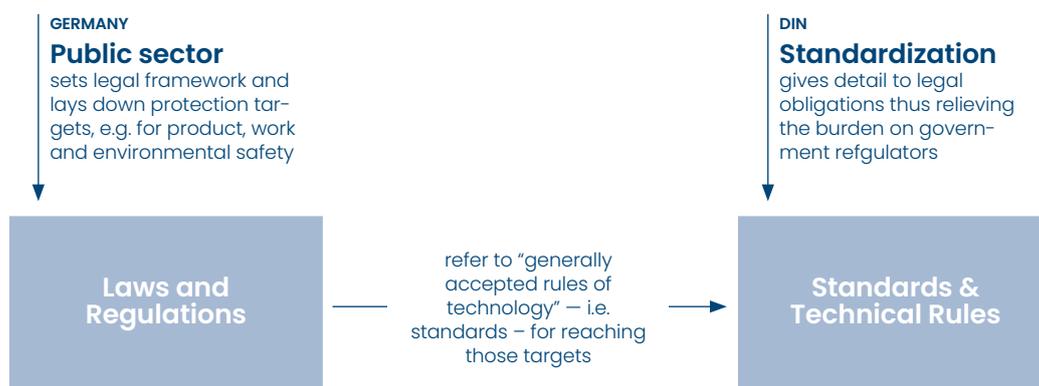
Regulations and laws can refer to technical rules described in standards without adopting the

whole standard as a regulation (see Figure 2). It is exceptional that a standard set by the government is adopted into a regulation, resulting in its mandatory use by industry. Since the government decides in only rare cases to adopt a standard into a regulation, no criteria are available. An example is the standard DIN EN 590:2017-10 (Automotive fuels - Diesel - Requirements and test methods), referenced in §4 of the Tenth Ordinance on Implementing the Federal Immission Control Act⁹².

As standards are voluntary by principle, the Government usually avoids adopting a standard into a regulation. However, it is common for the German Government to publish regulations in which essential requirements are given and then delegate these to the standardisation organisations to develop standards with more specific requirements. However, the only case where standards become mandatory is when use of those standards is stipulated in a contract between a supplier and a manufacturer, i.e. a private sector relationship.

On the other hand, standardisation can facilitate deregulation. The more private sector actors self-regulate through standards in the interest of their consumers, the general population and the environment, the fewer regulations are needed –

Figure 15: Technical regulations versus standards⁹¹



⁸⁹ For a complete list of principles, see BMWK/GPQI 2021, United in Quality and Safety, page 60

⁹⁰ World Trade Organization. (n.d.). Agreement on Technical Barriers to Trade. WTO. [↗](#)

⁹¹ DIN 2019, An Introduction to DIN [↗](#)

⁹² Zehnte Verordnung zur Durchführung des Bundesimmissionschutzgesetzes^{*)}). (n.d.-b). [↗](#)



In 1975, DIN concluded a contract with the Federal Republic of Germany by signing the Standards Agreement that recognises it as the national standards body in Germany and as an independent platform to coordinate standards development in Germany.

In the same agreement, DIN committed to prioritising standardisation projects in the public interest and ensuring that fair procedures enable less capable actors to participate in standardisation work.

DIN is financed through own income by selling standards (62%), through private funds (18%), membership fees and public funds (10% each). DIN provides Germany's representatives in non-governmental, international standards organisations, such



DKE is the trusted platform for standardisation, cooperation and the interaction of experts in electrical engineering, electronics and information technologies.

DKE is a division of the Association for Electrical, Electronic and Information Technologies (VDE, Verband der Elektrotechnik Elektronik Informationstechnik). VDE is one of Europe's oldest and largest technical-scientific associations, having developed standards since the end of the nineteenth century. DKE is primarily financed through the sales of standards (95%).

DKE provides Germany's representatives in non-governmental, international standards organisations, such as CENELEC, ETSI and IEC.

The German Institute for Standardization (DIN, Deutsches Institut für Normung) and the German Commission for Electrical, Electronic and Information Technologies of DIN and VDE (DKE, Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE) are the official national standards bodies recognised by the German Government.

Table 10 provides numbers relating to DIN. By 2021, DIN had facilitated the development of almost 35,000 standards. Every year, between 1,500 and 2,000 new standards are added. More than 36,000 experts support standardisation work by DIN in 69 standards committees and over 3,700 working committees. DIN's main income is from revenues through the sale of standards (62%). Other income sources include public and private funds and membership fees.

Table 10: DIN in numbers⁹³

	2021
Total Number of DIN Standards	34,830
Stakeholder Experts	36,247
DIN Core Members	3,437
DIN Staff Members	528
New DIN Standards in 2021	1,770
Draft DIN Standards	3,855
Standards Committees / Commissions	69 / 2
Working Committees	3,709

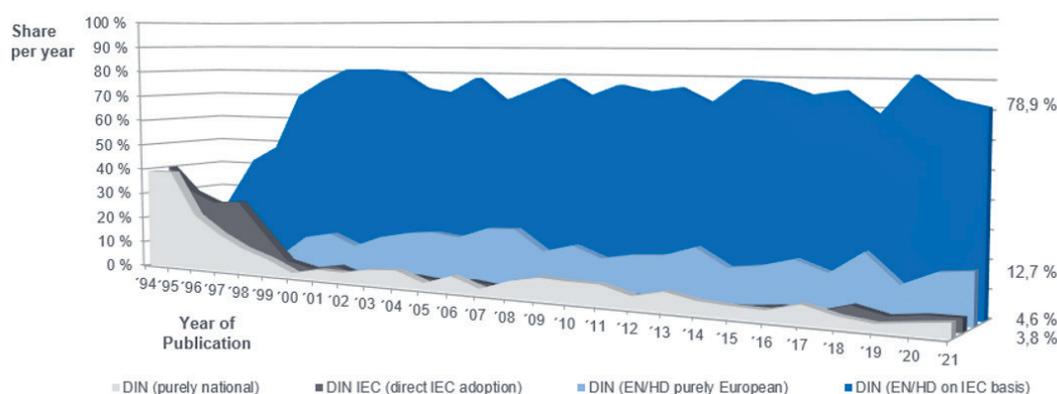
With regard to the electrotechnical field, DKE works with almost 10,000 experts in 1,105 working committees, which meet around 1,800 times yearly. DKE published 461 new standards in 2021.⁹⁴ With DKE’s ‘international first’ priority in mind, less than 5% of all standards in the electrotechnical field in Germany were developed on a purely national basis. The figure below shows the electrotechnical standardisation landscape in Germany. Almost 85% of all electrotechnical standards in Germany are based on IEC standards. This high number of IEC standards is achieved through the Frankfurt Agreement between CENELEC (the European

mission). The main principle of this agreement is the planning of common projects and adoption of IEC standards at CENELEC by default.

The standards development process in Germany

Figure 4 illustrates the standards development process in Germany. The process starts with the submission of a proposal for standards work. Such a written request can be sent by anyone, e.g. via the online form on the DIN or DKE websites. Next, proposals are assessed by the DIN or DKE experts responsible, in line with the criteria defined in

Figure 16: Nature of DIN and DKE standards (1994–2021)⁹⁵



Committee for Electrotechnical Standardization) and IEC (the International Electrotechnical Com-

DIN 820.⁹⁶ The most important criterion is the need for the respective standard in the sector. In step 2, an existing or a newly founded technical committee develops the standard content. Interested organisations or individuals can participate in the technical committees but must pay a fee when joining DIN committees. After consensus among committee members has been reached, a draft standard is published for 2–4 months to collect public comments online (step 3).

⁹³ DIN 2019, An Introduction to DIN, updated by Seifarth, J. 2022

⁹⁴ Spitteller, F. 2022. DKE German Commission for Electrical, Electronic and Information Technologies of DIN and VDE, Power Point Presentation

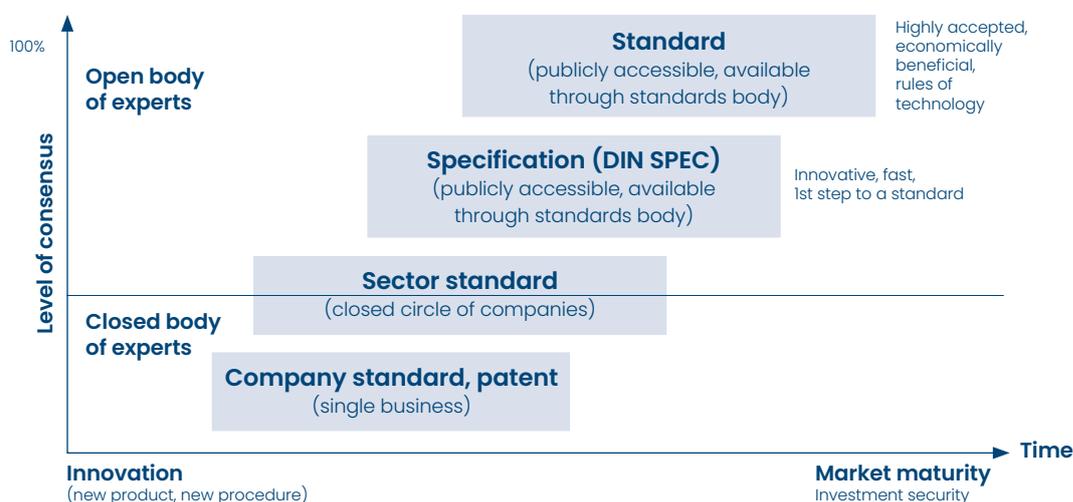
⁹⁵ Spitteller, F. 2022. DKE German Commission for Electrical, Electronic and Information Technologies of DIN and VDE, PowerPoint Presentation

⁹⁶ See DIN website: Principles of standards work. DIN. (n.d.).

Figure 17: Standards development process in Germany⁹⁷



Figure 18: Types of standards and private schemes⁹⁹



In the final step, DIN publishes the standard after incorporating valid comments and suggestions. Standards are reviewed by the respective technical committees at least every five years, in order to keep up to date with technological or societal advancements.

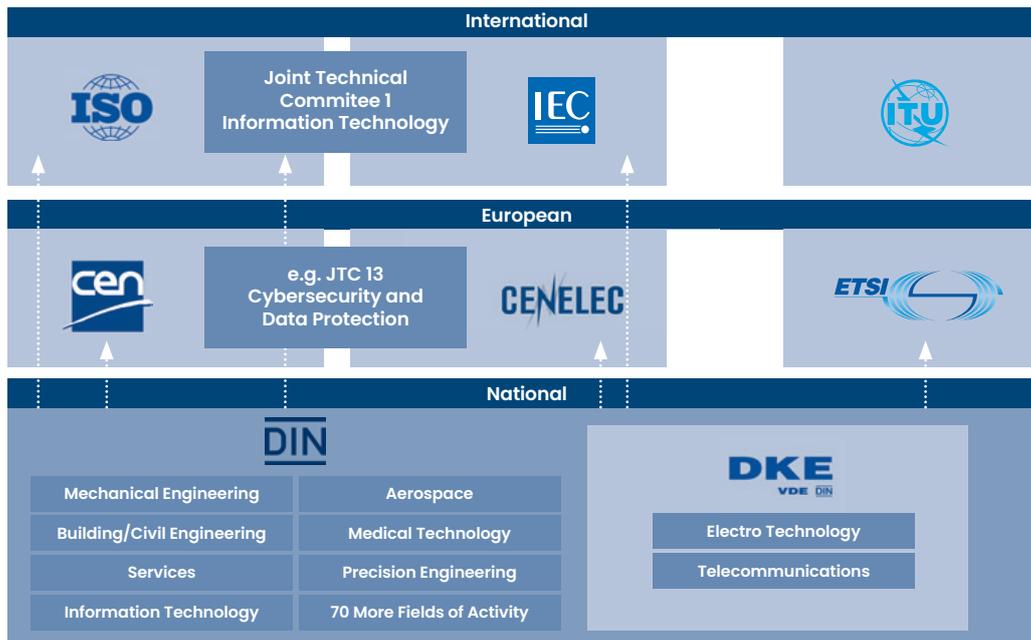
Specifications do not require all interested parties to participate or show full consent. To develop SPECs, at least three parties must be involved, but it is up to the authors to invite public comments. SPECs development can take from a few weeks to a few months, but certainly less than a year.

Due to the accelerating speed of technological developments or in the event of a societal or economic emergency, DIN can create specifications (SPEC) that undergo fast-track development.⁹⁸

Figure 5 depicts different types of standards placed between the axis of time and the level of consensus. A fully fledged standard requires complete consensus and takes more time to develop. Such standards are usually developed when a product or technology has reached market maturity and, as a result, investment security. As described above, SPECS take less time to develop, as they deal with innovative procedures that must be available quickly. Company

⁹⁷ DIN 2019, An Introduction to DIN, updated by Seifarth, J. 2022
⁹⁸ DIN SPECs are often interim solutions or innovative approaches in response to emerging technologies, market demands or specific project requirements. They are not fully fledged standards but provide a platform for experts to collaborate and develop consensus-based specifications.
⁹⁹ Siegel, N. 2009, What is Standardisation?

Figure 19: Standardisation system – national, European, international¹⁰⁰



or sector standards, however, rely on a closed body of experts and are developed during the innovation and experimentation phase of a product or process.

Figure 5 illustrates how Germany's standardisation system is embedded in European and international systems. German experts participate in European and international standard bodies. With regard to organisations, DIN sends delegates to the European Committee for Standardization (CEN) and the International Organization for Standardization (ISO). At the same time, DKE has its delegates in the European Committee for Electrotechnical Standardization (CENELEC) and the International Electrotechnical Commission (IEC). 85% of DIN's standardisation projects originate in Europe or internationally. Even 95% of electrotechnical standards are based on European or international standards.

Harmonisation of European standards

A harmonised European standard is developed by a recognised European standards organisation, i.e. CEN, CENELEC or ETSI, following a request from the European Commission (EC), having previously consulted with the Member States and relevant stakeholders on whether a standard was needed and valuable.

The European Commission uses harmonised European standards to specify EU legislation with concrete technical requirements. Even though harmonised standards are published in the Official Journal of the EU (OJEU), their use is voluntary. Manufacturers, other economic operators or conformity assessment bodies can use harmonised standards to demonstrate that products, services or processes comply with relevant EU legislation. Therefore, the presumption of conformity¹⁰¹ applies using harmonised standards cited in the OJEU. The EU website offers an overview of harmonised European standards structured by sector and products.¹⁰²

Standardisation strategies and future foresight

A standardisation strategy can be understood by identifying strategic priorities (phase 1 of the ISO guide¹⁰³ for developing a national standardisa-

¹⁰⁰ DIN 2019, An Introduction to DIN, [↗](#)

¹⁰¹ 'Presumption of conformity' means that following harmonised standards in the design and manufacture of products will ensure products are in line with corresponding EU rules. [↗](#)

¹⁰² The list of standards is available at: *Harmonised standards*. Single Market Economy European Union. (n.d.). [↗](#)

¹⁰³ ISO - International Organization for Standardization. (2020). *National Standardization Strategies (NSS)*. [↗](#)

tion strategy). This step is comparable with Germany's standardisation strategy, the Deutsche Normungsstrategie (DNS)¹⁰⁴. Concrete standardisation roadmaps (phase 2 of the ISO guide) are more advanced, similar to topic-focused standardisation roadmaps in Germany. Combining both is widely understood as a national standardisation strategy (NSS). Strategic priorities such as those defined in the DNS require updating at lengthier intervals than topic-specific standardisation roadmaps. Germany's DNS was last updated in 2016, but its content has remained current. The previous version was published in 2004 and received an update in 2009. On the other hand, concrete standardisation roadmaps have to be updated every 2 to 5 years.

DIN and DKE stakeholders frequently meet in several rounds to discuss future technologies. Many stakeholders from various industries, politics and research institutions participate in these meetings. This results in a broad view of what is currently important and of future topics for standardisation. A recent outcome of such stakeholder meetings resulted in DKE's future approach and strategy, the DKE Commitment 2030.¹⁰⁵

In addition, DIN and ISO rely on environmental scanning to systematically identify future trends at an early stage. To identify trends relevant for standardisation, a team selects and reviews publicly available trend reports from various organisations, including governments, international organisations, think tanks, non-governmental organisations, research institutes and consulting firms. To be selected for review, the trend reports must meet a set of criteria: less than five years old, published by a reputable source (no ideological bias and no profit motive), including references and a clear methodology for identifying and investigating trends with a regional or global focus. The trends chosen feature most frequently across these publications and have a strong link to standardisation, as revealed by mapping the trends to current and planned technical activities.¹⁰⁶

Furthermore, the European Commission annually releases an Annual Union Work Program (AUWP) for European standardisation.¹⁰⁷ This lays down the Commission's intentions to use standardisation to support new or existing legislation and policies. It mandates the development of new standardisation deliverables to the European standardisation organisations CEN, CENELEC and ETSI. This so-called standardisation request will ultimately lead to the harmonised European standards described above. The content and focus topics in the AUWP are closely discussed and decided jointly with the industry. The focus topics do not change significantly from year to year, but slight adjustments may occur. DIN and DKE closely follow the AUWP and consequently adopt their strategies regularly.

¹⁰⁴ *Mit Normung Zukunft gestalten! - din.de*. DIN. (2017). 

¹⁰⁵ See: DKE. (2022). *DKE commitment 2030*. 

¹⁰⁶ *Foresight*. ISO. 

¹⁰⁷ The 2022 annual EU work programme for European standardisation 

Case study: electric motor

Table 11 provides an overview of harmonised standards which a manufacturer of electric motors may use to ensure compliance with legal requirements. The standards depend on the essential requirements applicable and identified during the risk analysis and the specifics of the product. The listed versions provide a presumption of conformity.

Table 11: Overview of harmonised standards used by manufacturers of electric motors¹⁰⁸

Legislation	Harmonised standards
Electromagnetic Compatibility Directive (EMCD)	<ul style="list-style-type: none"> • EMC directive EN 60034-1: Rotating electrical machines – Part 1: Rating and performance • EN 61000-3-2: Electromagnetic compatibility (EMC) – Part 3-2: Limits – Limits for harmonic current emissions • EN 61000-3-3: Electromagnetic compatibility (EMC) – Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems
Low voltage directive (LVD)	<ul style="list-style-type: none"> • EN 60034: Rotating electrical machines; especially the following parts: <ul style="list-style-type: none"> ○ Part 1: Rating and performance ○ Part 5: Degrees of protection provided by the integral design of rotating electrical machines (IP code) – Classification ○ Part 6: Methods of cooling (IC Code) ○ Part 7: Classification of types of construction, mounting arrangements and terminal box position (IM Code) ○ Part 8: Terminal markings and direction of rotation ○ Part 9: Noise limits ○ Part 11: Thermal protection ○ Part 12: Starting performance of single-speed three-phase cage induction motors ○ Part 14: Mechanical vibration of certain machines with shaft heights 56 mm and higher – Measurement, evaluation and limits of vibration severity
Ecodesign directive for electric motors	<ul style="list-style-type: none"> • EN 60034-2-1: Rotating electrical machines – Part 2-1: Standard methods for determining losses and efficiency from tests (excluding machines for traction vehicles) • EN 60034-30: Rotating electrical machines – Part 30: Efficiency classes of single-speed, three-phase, cage-induction motors (IE-code)

¹⁰⁸ BMWK/ GPQI 2021, United in Quality and Safety.

3.3.2 Metrology and legal metrology

Key points in this section:

- **BMWK holds overall supervisory responsibility for metrology, whereas PTB is Germany's National Metrology Institute**
- **Germany's legal metrology system is embedded in Europe's legal metrology system. Hence legal metrology in Germany is shaped by European directives and regulations and German laws and ordinances**
- **PTB and its three designated institutes ensure the international recognition of national measurement standards and dissemination of SI units in Germany**
- **There are approximately 600 accredited calibration laboratories in Germany**
- **The manufacturer is in charge of conformity assessment before placing a measuring instrument on the market; the instrument's user is responsible for its calibration and the federal state agencies for verification of the instrument's accuracy**
- **Germany actively participates in European and international metrology institutions to harmonise metrology internationally, mutually peer-review calibration and measurement capacities (CMC) within the CIPM MRA and offer development support to other NMIs**

System of metrology in Germany

The system of metrology in Germany consists of:

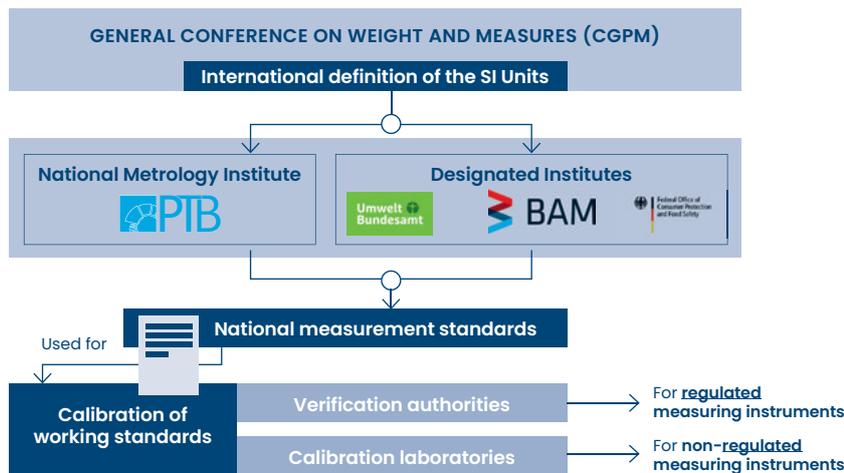
- **legal metrology** – regulatory requirements for units of measurement, instruments, measurements;
- **industrial metrology** – application of measurements in industry and society, e.g. for quality control;
- **scientific metrology** – establishment and maintenance of units of measurement and standards.

The Physikalisch-Technische Bundesanstalt (PTB) is the German National Metrology Institute responsible for scientific and industrial metrology and, to some extent, for legal metrology. Legal metrology is under the purview of the Federal Ministry for Economic Affairs and Climate Action (BMWK, Bundesministerium für Wirtschaft und Klimaschutz). PTB is a subordinate authority of BMWK, which has a technical supervisory function. PTB is advised by a multi-disciplinary board of trustees that includes academia and the private sector.

PTB and its three designated institutes ensure the chain of measurement standards (see Figure 7). The measurement standards are based on the International System of Units (SI) defined by the International General Conference on Weights and Measures (CGPM, Conférence générale des poids et mesures). Each of the three designated metrology institutes (DIs) in Germany focuses on a specific technical area.

- **Chemical metrology** – Federal Institute for Materials Research and Testing (BAM, Bundesanstalt für Materialforschung und -prüfung);
- **Residues in food** – Federal Office for Consumer Protection and Food Safety (BVL, Bundesamt für Verbraucherschutz und Lebensmittelsicherheit);
- **Air quality** – German Environment Agency (UBA, Umweltbundesamt).

Figure 20: Chain of measurement standards in Germany.¹⁰⁹



Around 600 public and private accredited calibration laboratories and various verification offices at federal state level calibrate their working standards using the national measurements of PTB and its DIs.

The calibration of some measurement instruments and assessment of measurement procedures is supported through certified reference material (CRM). CRM production is part of chemical metrology and falls under the responsibility of BAM, which offers over 400 different materials in its webshop.¹¹⁰

Legal metrology in Europe and Germany

Germany's legal metrology system is embedded in Europe's legal metrology system, so both systems need to be described in conjunction with one another (see Figure 8). Regulation of the market for measuring instruments is harmonised across the EU. In line with the NLF, the EU passed two directives relevant to legal metrology:

- Directive 2014/32/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of measuring instruments;

- Directive 2014/31/EU of the European Parliament and of the Council of 26 February 2014 on the harmonisation of the laws of the Member States relating to the making available on the market of non-automatic weighing instruments.

Both European directives were adopted when revising German legislation on measuring and verification (MessEG, Mess- und Eichgesetz) and its ordinances. Moreover, 150 additional measuring instruments are regulated in Germany. Based on the MessEG, commercially used measuring instruments must be conformity-assessed by the users and re-verified by federal state agencies to ensure their accuracy.

In addition, the EU passed directives on pre-packaged products, bottles used as measuring containers and metrological control methods, all of which were adopted into national law. All directives include defining essential measuring instrument requirements, i.e. the results to be attained, but not the technical solutions. The latter are defined in standards or other technical specifications.

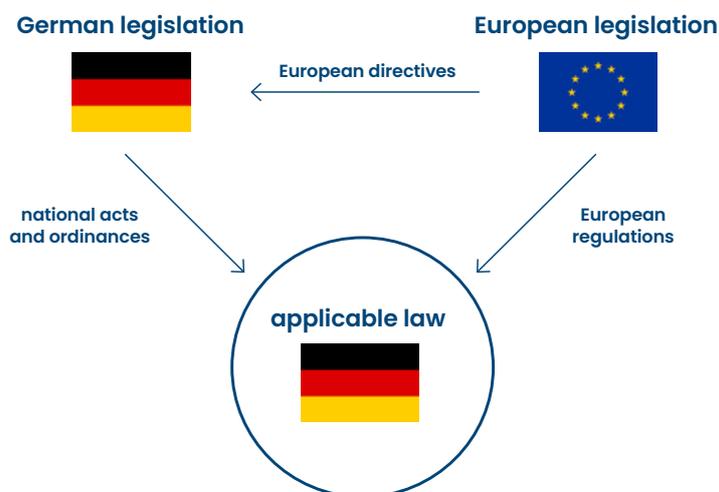
In addition, the EU has also passed various European regulations with relevance to legal metrology to be implemented in Germany:

- Regulation (EU) No. 1025/2012 of the European Parliament and of the Council of 25 October 2012 on European standardisation;

¹⁰⁹ BMWK/ GPQI 2021, United in Quality and Safety.

¹¹⁰ Willkommen im Webshop der Bami!. Startseite BAM. (n.d.).

Figure 21: German vs. European legislation.¹¹¹



- Regulation (EU) No. 2019/515 of the European Parliament and of the Council of 19 March 2019 on the mutual recognition of goods lawfully marketed in another Member State;
- Regulation (EU) No. 2019/1020 of the European Parliament and of the Council of 20 June 2019 on market surveillance and compliance of products.

In Germany, BMWK is the coordinating agency for legal metrology and has the following tasks and responsibilities:

- responsibility for policy decisions and legislation on legal metrology;
- appointing conformity assessment bodies (CABs);
- notification of CABs for instruments belonging to the Measuring Instrument Directive (MID)/Non-Automatic Weighing Instruments Directive (NAWID);
- allocation of national ID numbers to CABs;
- oversight of appointed CABs from EEA countries;

- oversight of CABs of PTB;
- no responsibility for market surveillance, in-use inspections and verifications.

Germany operates a Rule Determination Committee (Regelermittlungsausschuss). Based on the state of the art, this committee determines rules, scientific insights, technical specifications for measuring instruments, conformity assessment procedures and those who use measuring instruments or measured values. The committee comprises the PTB, the respective authorities of the federal states, conformity assessment bodies, state-accredited test centres, trade associations and consumer associations. The committee is located at the PTB, which presides over it and houses its executive office.¹¹²

When measuring instruments are placed on the market, the manufacturer has various duties and responsibilities:

- measuring instruments must satisfy the essential requirements;
- a conformity assessment must have been carried out successfully;
- a declaration of conformity by the manufacturer must be available;

¹¹¹ Mäuselein, S. (2022). Legal Metrology Regulatory framework in Germany and Europe. PowerPoint Presentation

¹¹² Regelermittlungsausschuss. PTB. (n.d.).

- the conformity of a measuring instrument must be validated using a label, e.g. CE¹¹³ marking and supplementary metrology (M) marking;
- the measuring instrument must be furnished with the inscriptions indicated.

Verification of measuring instruments is carried out regularly by the responsible authorities of the federal states once the instrument has been put into operation. Verification entails:

- official inspection, assessment and labelling of a measuring instrument;
- permission to use the measuring instrument for a further verification period.

International participation and cooperation

PTB is a member of the two relevant European metrology organisations: the European Association of National Metrology Institutes (EURAMET) for industrial and scientific metrology, and the European Cooperation in Legal Metrology (WEL-MEC) for legal metrology.

The German and European metrology systems are again embedded in the international metro-

logy system by the Metre Convention, its institution, the International Bureau of Weights and Measures (BIPM) and the International Organization of Legal Metrology (OIML). This vertical cooperation and coordination has led to international recognition and harmonisation in the field of metrology.

PTB, BAM, BVL and UBA participate in the Mutual Recognition Arrangement (MRA) of the International Committee for Weights and Measures (CIPM) to undergo regional and international peer reviews to mutually approve the calibration and measurement capabilities (CMC) of NMIs. Successfully peer-reviewed CMCs are registered on the BIPM key comparisons database.¹¹⁴

Germany actively participates in the OIML certification system (OIML-CS) for regulated measuring instruments, i.e. it can issue international test reports and accept those from others. The OIML-CS aims at harmonising technical requirements for regulated measuring instruments globally.

To support metrology development and advancement worldwide, PTB is involved in international technical cooperation on quality infrastructure, mostly commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ, Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung).

Case study: electric motor¹¹⁵

Electric motors must comply with strict limits defined in the Electromagnetic Compatibility Directive (EMCD). Hence, manufacturers require a precise measurement of electromagnetic fields emitted by electric motors. They must test whether their motor is immune to other electromagnetic fields. Many manufacturers rely on third-party testing

laboratories for such measurements, since they usually require sophisticated testing facilities. Accredited calibration laboratories must calibrate any measuring instruments used by testing laboratories. These laboratories receive their measurement standards from PTB, which, in turn, derives them from international definitions of the SI units.

¹¹³ CE stands for Communauté Européenne – French for ‘European Community’, a predecessor organisation of the EU. The CE marking is a self-declaration that a product/instrument conforms to applicable requirements and that the manufacturer has conducted conformity assessment.

¹¹⁴ Number of key comparisons by state or economy. BIPM. (n.d.-b). 

¹¹⁵ BMWK/ GPQI 2021, United in Quality and Safety

3.3.3 Conformity assessment and accreditation

Key points in this section:

- **Conformity assessment creates trust in the quality and safety of products**
- **Accreditation proves the competence of conformity assessment bodies (CABs) in regulated and non-regulated areas**
- **Laws, directives, and standards constitute the basis for CABs' work and their accreditation**
- **EU and German accreditation are ruled by principles, including 'one national accreditation body per country', 'no competition' and 'independence'**
- **The German national accreditation body DAkkS has been operating since 2010 and has the entrusted legal mandate for accreditation in Germany**
- **CABs provide conformity assessment services in regulated and non-regulated areas**
- **The regulated area for the marketing of products is based on the EU's New Legislative Framework (NLF) and sector-specific EU harmonisation legislation**
- **In the regulated area, conformity assessment is performed by accredited and legally authorised CABs, so-called notified bodies, which have been designated by their national notifying authorities**
- **In the unregulated area, CABs use standards and private schemes to assess compliance**
- **Geprüfte Sicherheit (Tested Safety – GS) and Grüner Knopf (Green Button) are examples of voluntary schemes that provide marks in the case of compliance with their requirements**

Definitions and principles

Conformity assessment creates trust in the quality and safety of products, processes and services. By contrast, accreditation creates trust in the competence of those who perform conformity assessments, i.e. the conformity assessment bodies (CABs).

The legal framework for accreditation, adopted in Regulation (EC) No. 765/2008, describes the key principles of accreditation in the EU. Among them, 'one national accreditation body (NAB) per country' and 'no competition' between NABs of Member States are key principles. Cross-border accreditation within the EU is only allowed in exceptional cases. Moreover, accreditation in the EU must be both a public authority activity and non-profit.¹¹⁶ CABs are accredited once in the EU (and/or by a non-EU accreditation body) and their services are accepted everywhere through MRAs. To ensure the same level of excellence across all NABs within the EU, the European Cooperation for Accreditation (EA) operates peer evaluations of NABs, which are rigorous and transparent mutual checks against the relevant requirements, such as the ISO/IEC 17011 standard for accreditation.

The overarching guiding principles of accreditation in Germany are trust building and meeting the NAB's responsibilities. Trust building includes creating confidence and providing justification through high standards, rigorous evaluation and transparent processes. However, accreditation is not a guarantee of errorless conformity assessment but a tool proving the competence of CABs.¹¹⁷

The German accreditation body, DAkkS and other European NABs meet their responsibilities by being impartial, objective and independent. The development of standards for accreditation bodies and CABs is transparent and applicable worldwide, since it abides by the key standardisation principles and follows a participatory process under the purview of the International Organization for Standardization (ISO).

¹¹⁶ EU Regulation (EC) 765/2008

¹¹⁷ DAkkS Homepage. DAkkS. (n.d.). 

Figure 22: Accreditation and conformity assessment.¹¹⁸

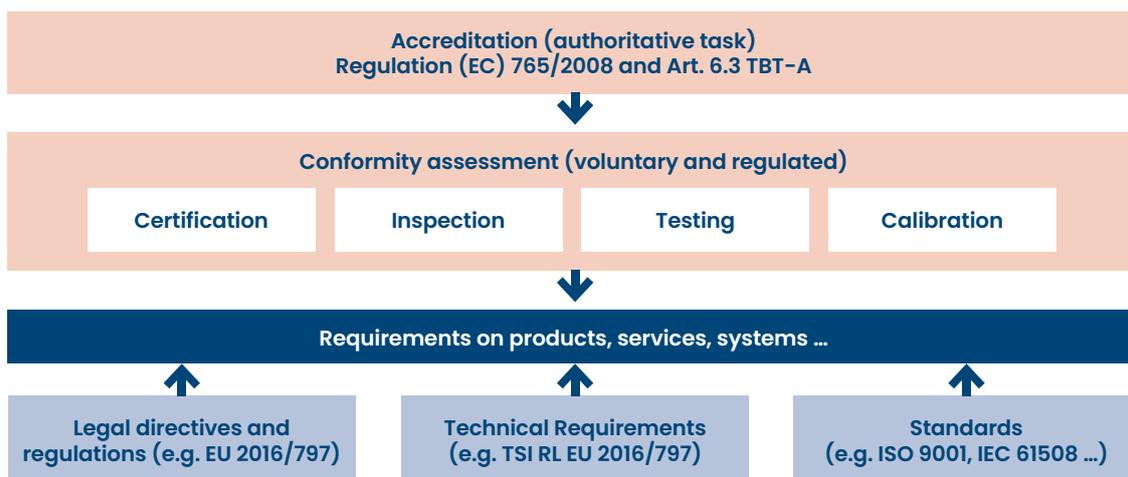


Figure 23: Accreditation and conformity assessment.¹¹⁹

International level	European level	National level
Technical Barriers to Trade Agreement (TBT)	Regulation (EC) No. 765/2008	Accreditation Body Act (AkkStelleG)
ILAC MRA/MLA	Regulation (EU) 2019/515	Entrusting Regulation (AkkStelleGBV)
IAF-MRA/MLA	Regulation (EU) 2019/1020	Fee Regulation (AkkStelleGebV)
Sev. MRAs within FTAs (e.g. CETA, South Korea)	Regulation (EG) No. 768/2008	Accreditation Symbol Regulation (SymbolVO)
	Regulation (EU) No. 1025/2012	
	Directive on Information 1535/2015 EU	
	Directive on Public Procurement Art. 44 2014/24/EU	

Figure 22 illustrates how accreditation services are used in different conformity assessment areas: certification, inspection, testing and calibration (plus validation and verification, proficiency testing, CRM production and biobanks). In addition to laws and directives, standards constitute the basis for the work of all NABs and their accreditation services.

Accreditation: national, regional, international

The German Accreditation Body Act (AkkStelleG) is relatively new. It was passed only in 2009 to implement EU Regulation (EC) No. 765/2008. Prior to 2009, Germany had a fragmented system of up to twenty public and private accreditation bodies, which overlapped and heavily competed in their range of services.

The German NAB DAkkS, in operation since 2010, has received the legal mandate to accredit CABs in Germany. It is subject to supervision by the Federal Government of Germany, which delegated the public service task of accreditation to DAkkS by

¹¹⁸ DAkkS (2022). Accreditation in Germany. PowerPoint Presentation
¹¹⁹ DAkkS (2022). Accreditation in Germany. PowerPoint Presentation, GPQI workshop on conformity assessment and accreditation in Indonesia and Germany, 2 Nov. 2022

entrustment. DAkKS operates on a non-profit basis. In May 2023, DAkKS had 5,048 active accreditations with CABs across all accreditation areas.¹²⁰

DAkKS' accreditation decisions are made independently and impartially. After a positive assessment of a CAB's technical competence and its management system, an Accreditation Committee evaluates the assessment results and decides on granting accreditation. The Accreditation Committee is an independent decision-making body consisting of about 230 expert members appointed by DAkKS' Executive Board for a specific field of activity on the committee for five years. The technical areas in which each member can be included in accreditation decisions depend on their areas of expertise and are pre-defined. Hence, composition of the Accreditation Committee varies from process to process.¹²¹

DAkKS is firmly integrated into the European and international accreditation structures. It is a member of the EA, the International Accreditation Forum (IAF) and the International Laboratory Accreditation Cooperation (ILAC). It is a signatory to their multilateral agreements (MLA/MRA). The aim of this international cooperation is to enable global acceptance of conformity assessments through accreditation and thus reduce international barriers to trade.

Conformity assessment in regulated versus unregulated areas in Germany

Conformity assessment bodies (CABs) provide conformity assessment services in the

- regulated area: involvement of CABs and notified bodies in conformity assessment procedures based on legislative provisions;
- unregulated area: involvement of CABs in conformity assessment procedures is volun-

tary and based on standards (i.e. ISO 9001) or private schemes.

- In the regulated area, the EU regulatory system is based on the precautionary principle and consists of the New Legislative Framework (NLF), which contains the necessary elements for conformity assessment, accreditation and market surveillance for various products and services;¹²²
- different sector-specific EU harmonisation legislation, e.g. the radio equipment directive, low voltage directive or personal protective equipment regulation.

The NLF supports the free movement of goods within the European Single Market. Its specific legislative acts also address required conformity assessment procedures. The NLF includes mutual acceptance of conformity assessment results, e.g. test reports and certificates issued by conformity assessment bodies officially notified by EU member countries. This follows the 'one standard, one test, accepted everywhere' principle.

In addition, different types of Mutual Recognition Agreements (MRAs) and Free Trade Agreements (FTAs) are established between the EU and third countries outside the EU for mutual recognition of conformity assessment results of regulated products and, thus, easier market access. Accreditation as a tool facilitates mutual recognition and international market access, since it guarantees worldwide equivalence of conformity assessment results and strengthens competitiveness. However, it does not imply legal recognition, which makes further legislation between governments or states necessary.

In the regulated area, there is a presumption of conformity by linking legislative requirements and their fulfilment through the application of harmonised standards (see Section 3.3.1 of this document). Different conformity assessment procedures can be applied, depending on the respective product's risk class. Specific conformity assessment procedures require the involvement of a notified body in dependence of the risk class.

¹²⁰ See detailed accreditation numbers on the DAkKS website: 

¹²¹ Accreditation Committee. DAkKS. (n.d.-a). 

¹²² The NLF consists of Regulation (EC) 765/2008 (dealing with accreditation and market surveillance), Decision 768/2008 (on CE marking principles, notifying and notified bodies and conformity assessment procedures) and Regulation (EU) 2019/1020.

There is an interplay of legislation and standards to meet the requirements for conformity assessment in the regulated area (applicable legislation). The notified bodies use:

- harmonised legislations that provide the requirements to be met: what shall be achieved?
- harmonised standards as an instrument that describes: how is compliance demonstrated?

Harmonised legislation requires the mandatory involvement of notified bodies for high-risk products. Therefore, these notified bodies carry out conformity assessment activities as determined by the conformity assessment procedures per applicable legislation.

The notification of conformity assessment bodies (CABs) comprises designation requirements determined by the relevant harmonised legislation. Notification means that the notifying authority will notify a CAB to the EU Commission after the designation procedure has been finalised successfully.

A notified body is included in the NANDO database.¹²³ The CAB indicates its scope, conformity assessment activities and procedures for the notification procedure. The notification can often be simplified in the event that a CAB has an accreditation for the respective conformity assessment activity to prove its technical competence.

Various control mechanisms exist to ensure a level-playing field for CABs, as well as for notified bodies where required, and to build trust and confidence in their activities. Firstly, accreditation is important in regulated and unregulated areas, with regular assessments by accreditation bodies. Secondly, the different product legislations include regular surveillance activities by notifying authorities. Finally, re-accreditation, re-notification and regular surveillance activities

guarantee consistent competence and quality among CABs and notified bodies.

In the unregulated area, CABs assess and certify, for instance, management systems, services, products and processes. Typical examples are the ISO 9001 quality management system, energy management systems or service quality in tourism. Here, the CABs use standards and private schemes to identify and meet the requirements:

- determined by voluntary private schemes or provided by standards – what is to be achieved?
- further standards are used: how is compliance with schemes or standards to be demonstrated?

Many private conformity assessment bodies in Germany operate in regulated and non-regulated areas.

Table 12 (p. 71) provides an overview of accredited CABs per relevant conformity assessment area in Germany. DAkkS is a signatory of IAF MLAs and ILAC MRAs for all accreditation scopes offered, except the new scheme for biobanking facilities ISO 20387:2018.

¹²³ The New Approach Notified and Designated Organisations (NANDO) database provides information on notified bodies responsible for assessing the conformity of goods which are placed on the EU market: [📄](#)

Table 12: Data on accredited CABs in Germany by Dakks. (2021)¹²⁴

Scope	Type of conformity assessment	Accreditation standard	MLA/MRA	No. of accredited CABs
IAF MLA	Product Certification	ISO/IEC 17065:2012	05/04/18	339
	Management System Certification	ISO/IEC 17021-1:2015	See footnote ¹²⁵	187
	Person Certification	ISO/IEC 17024:2012	20/10/16	55
	Validation and Verification	ISO/IEC 17029:2019	N.A.	24
	Greenhouse Gases	ISO 14065:2013	26/10/18	0
ILAC MRA	Testing	ISO/IEC 17025:2017	02/11/00	2,440
	Medical Laboratories	ISO 15189	02/11/00	450
	Calibration	ISO/IEC 17025:2017	02/11/00	513
	Inspection	ISO/IEC 17020:2012	24/10/12	276
	Proficiency Testing	ISO/IEC 17043	07/06/19	26
	Reference Material Production	ISO 17034:2016	22/04/20	21
	Biobanking Facilities	ISO 20387:2018	N.A.	0

CE, GS and Green Button markings

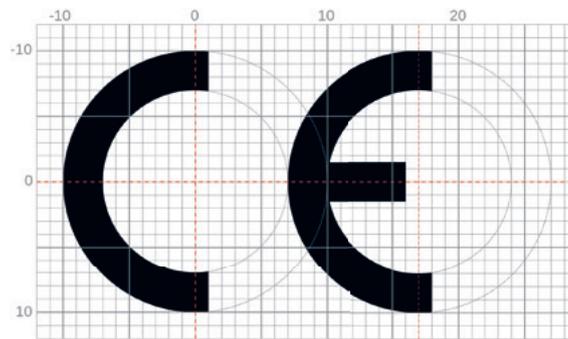
CE marking was introduced in 1993. It is mandatory for products covered by EU harmonisation, e.g. high-risk products or measuring instruments. By applying the CE marking, the manufacturer declares that a product complies with all applicable legislation. To this end, the manufacturer selects and carries out the applicable conformity assessment procedure, involving a notified

body in the event that this is required by the relevant conformity assessment procedure due to the risk class. Should a notified body need to perform the conformity assessment in line with the applicable EU harmonisation legislation, the manufacturer must add its identification number to the CE marking. The target group are the national market surveillance authorities, in Germany at the level of the federal states.

¹²⁴ Dakks Annual Report, 2021

¹²⁵ DFood Safety ISO 22000:2018, 2005 (FSMS) 05.04.18, QMS ISO 9001:2015 (QMS) 22.01.98, Environmental ISO 14001:2015 (EMS) 09.10.2004, Information Security ISO/IEC 27001:2013 (ISMS) 05.04.18 Energy ISO 50001:2018, 2011 (EnMS) 05.04.2018, Medical Devices ISO 13485:2016 (MDMS) 05.04.18 and Occupational Health and Safety ISO 45001:2018 (previously OHSAS 18001) 05.02.2020.

Figure 24: CE mark¹²⁶



The Geprüfte Sicherheit (GS, Tested Safety) mark is a voluntary certification mark for products (including technical equipment) introduced in 1977. It indicates that the equipment meets German and, if available, European safety requirements for the respective device.¹²⁷ CE marking, by contrast, is issued for the signing of a declaration that the product complies with European legislation (see Table 5). The CE mark cannot be used

for advertising purposes. Hence, producers need to obtain the GS mark if they want to advertise the quality of its product. The GS mark is based on the German Product Safety Act (ProdSG, Produktsicherheitsgesetz). Although the GS mark was designed to focus on the German market, it is found on many electronic products and machinery sold worldwide. Many different CABs in Germany offer testing for the GS mark.

Figure 25: GS mark¹²⁸



¹²⁶ European Commission

¹²⁷ The German Central Authority of the Federal States for Safety Engineering (ZLS) authorises conformity assessment bodies to award the GS mark. The certification bodies or testing laboratories demonstrate their technical competence ideally via accreditation.

¹²⁸ European Commission

Table 13: CE versus GS – a comparison¹²⁹

Information	CE mark	GS mark
Introduction	1993	1977
Use	Mandatory	Voluntary
Issued by	Manufacturer	Independent testing and certification body
Legal background	EU regulations	German Product Safety Act (ProdSG)
Target group	National regulatory authorities	Consumers
Function	Administrative mark	Quality seal
Testing performed by independent institution	In general, 'no'. However, depending on the EU legislation applicable, it may be required to perform conformity assessment by a third party /notified body	Yes
What is verified?	Compliance with EU harmonised legislation	Safety

The Green Button (Grüner Knopf) is a government-run certification label for sustainable textiles introduced in 2019. It is the first certification label that systematically evaluates whether companies take responsibility for respecting human rights and environmental standards in their supply chains. The initiator and owner of the mark is the German Federal Ministry for Economic Cooperation and Development (BMZ, Bundesministerium für wirtschaftliche Zusammenarbeit und Entwicklung). The Green Button mark combines social and environmental requirements for both the product and the manufacturer. Textile production must meet environmental criteria. Based on UN and OECD criteria, the manufacturer must ensure that corporate human rights and environmental due diligence are implemented in its supply chain. Independent certification bodies, accredited by DAkkS, perform the conformity assessment.

Figure 26: Green Button mark¹³⁰



¹²⁹ TÜV Rheinland. (n.d.). FAQ – CE marking and GS Mark – the differences – TÜV. [↗](#)

¹³⁰ Der Grüne Knopf. Grüner Knopf. [↗](#)

Case study: electric motor

The case study describes conformity assessment requirements in the context of the Electro-magnetic Compatibility Directive (EMCD), since electric motors must comply with this directive. The EMCD stipulates that if CABs are involved in the process, they must be officially notified. The EMCD offers two options during the conformity assessment of the design phase and the production phase of an electric motor. The manufacturer can select one of the two options:

- **Option 1:** internal production control (Module A);
- **Option 2:** combination of EU-type examination (Module B) and conformity to type (Module C).

Table 14: Conformity Assessment Options for the EMC Directive¹³¹

	Design phase	Production phase
Option 1	<p>Module A: International production control</p> <ul style="list-style-type: none"> • Manufacturer creates the technical documentation (incl. risk analysis, applicable essential requirements, information on design, manufacture and operation of the product) 	<ul style="list-style-type: none"> • Manufacturer takes necessary measures to ensure that the manufactured products complies with the one outlined in the technical documentation
Option 2	<p>Module B: EU type examination</p> <ul style="list-style-type: none"> • Manufacturer creates the technical documentation • Notified body examines the technical documentation (no specimen). Is the design adequate to fulfill the essential requirements? • Notified body creates an evaluation report • If evaluation was successful, the notified body issues the manufacturer with an EU type examination certificate • Notified body informs its notifying authority about the issuing (or refusal) of a certificate • If the notified body refuses or withdraws a certificate it informs other notified bodies 	<p>Module C: Conformity to type</p> <ul style="list-style-type: none"> • Manufacturer ensures and declares that the manufactured products are in compliance with the type described in the EU type examination certificate during Module B • No involvement of a notified body

¹³¹ BMWK/ GPQI 2021, United in Quality and Safety.

Both options and modules are presented in Table 14

In Option 1/Module A and Option 2/Module C, no third-party conformity assessment (notified body) is involved. In Option 2, the production phase (Module C) follows the same logic as the internal production control in Option 1.

In Option 2/Module B, a notified body is involved during the type examination (design phase). However, even if the EU legislation does not stipulate the involvement of a third-party CAB, manufacturers can still involve them voluntarily in all modules. CABs support companies to increase the safety and quality of products and, hence, improve their competitiveness in markets. Voluntary testing and certification relate to product features such as functioning, performance, sustainability, and safety. From

the manufacturer's perspective, it is a big advantage if a contracted CAB is accredited, since the conformity assessment results are then recognised internationally. This facilitates international market access and strengthens competitiveness.

If a CAB applies to become a notified body, it should ideally be accredited to demonstrate its technical competence. The responsible notifying authority in Germany for EMCD assessment is the Federal Network Agency (BNetzA, Bundesnetzagentur). Accreditation is not a mandatory precondition to becoming a body notified by the BNetzA, but during the notification process available accreditation certificates, such as EN ISO/IEC 17025, are considered by the notifying authority, in addition to a compliance check with the EMCD and relevant standards. Hence, many CABs get accredited before applying for notification.

3.3.4 Market surveillance and product safety

Key points in this section:

- **Well-working market surveillance is an essential public control instrument**
- **In Germany, market surveillance is carried out by the federal states (Länder)**
- **Market surveillance usually begins after a product is placed on the market**
- **Factory surveillance, i.e. conformity assessment, takes place before a product is on the market**
- **Key market surveillance principles are strategising, risk-based approach and proportionality of non-compliance measures**
- **Online trading of products creates various new challenges for market surveillance**

Product surveillance in Germany and the EU

Market surveillance ensures that non-food products on the EU market do not harm European consumers and workers. It also protects other public interests such as the environment, security and fair trade. It entails responses to non-compliance such as product withdrawals, recalls and applying sanctions to stop the circulation of non-compliant products and bring them into compliance.

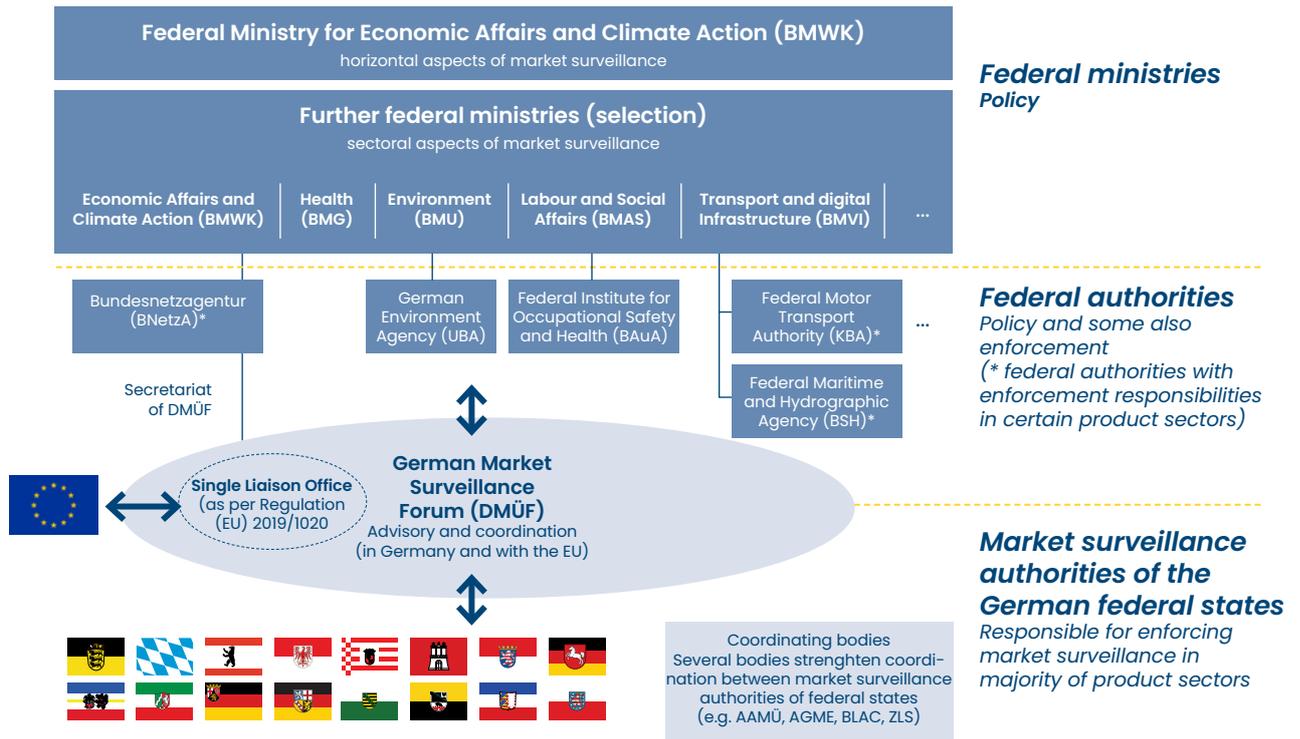
The objectives of market surveillance are:

- to protect citizens from unsafe products;
- to strengthen fair competition and level the playing field in markets.

Germany as an EU member follows EU legislation. This includes the latest Market Surveillance Regulation (EU) 2019/1020 that came into force in July 2021. In Germany, the Market Surveillance Act (MüG), which regulates market surveillance in the non-food sector, has been adopted in line with the new EU Regulation 2019/1020. The MüG has become a separate law after the previous German Product Safety Act (ProdSG) was amended and split into three laws (see Figure 15). The MüG aims to strengthen the market surveillance authorities' access to products traded online and the economic actors behind them, such as fulfilment service providers and online platforms. The MüG covers the European-harmonised and non-harmonised product areas.

In Germany, market surveillance of the products that fall within the scope of the Product Safety Act (ProdSG) is carried out by the enforcement authorities of the federal states (Länder), which organise market surveillance in line with their state structures. This results in market surveillance being handled differently in different locations across the country, even though the authorities use the same benchmarks when performing market surveillance activities. The Central Authority of the Federal States for Safety Engineering (ZLS) has a coordinating task between the federal states regarding market surveillance.

Figure 27: Key institutions in the German market surveillance system¹³²



The German Market Surveillance Forum (Deutsches Marktüberwachungsforum, DMÜF) has an advisory and coordination function in Germany and with the EU (Figure 27). It comprises all ministries involved at the federal level, the market surveillance authorities at the state level and their coordinating bodies.

To facilitate coordination activities with the EU, DMÜF operates a liaison office at the EU in Brussels. The amended version of the ProdSG came into force on 16 July 2021. The Product Safety Act translates the General Product Safety Directive 2001/95/EC and other relevant Single Market directives into German law.

Figure 28: Amendment of the ProdSG (2021)¹³³



¹³² BMWK/ GPQI 2021, United in Quality and Safety
¹³³ TAN, Swee Yin 2023. Market surveillance system in Germany & role of 3rd party Conformity Assessment Body, TÜV/ Süd, PowerPoint Presentation, 2.2.2023

In the new Product Safety Act (2021), definitions, provisions defining the presumption of conformity, and the competencies of authority empowering CABs to carry out conformity assessment remain unchanged. The ProdSG contains provisions governing the GS mark (see Section 3.3.3), the Committee for Product Safety (Ausschuss für Produktsicherheit, AfPS) and administrative and criminal offences.

The amended ProdSG now stipulates that the CAB which provides the GS mark must publish product pictures for easier product identification. Furthermore, authorised representatives must submit the GS mark application if a manufacturer is based outside the EU.

Market surveillance

EU countries must ensure effective surveillance of their markets. They are required to guarantee that:

- products placed on the market are monitored;
- the marking and documentation requirements have been respected;
- products have been designed and manufactured in accordance with EU requirements;
- market surveillance authorities have the necessary powers, resources and knowledge to perform their functions (and do not solely rely on third-party assessment bodies);
- procedures are put in place for follow-up and monitoring.

In the EU, market surveillance usually begins after a product is placed on the market. Market surveillance ensures that products on the market comply with the applicable requirements in accordance with EU legislation and German national legal acts. By contrast, conformity assessment, e.g. factory surveillance, takes place before a product is made available.

In Germany, the implementation of market surveillance is coordinated at the national level. However, the federal states are chiefly responsible for implementing market surveillance.

The BMWK coordinates the cross-sectoral aspects of market surveillance. It also represents Germany in market surveillance issues at the EU level. Various federal ministries are responsible for the individual product sectors in their area of responsibility and for implementing EU legislation, including in sectors such as environment, health, labour or transport (see Figure 14).

Cross-border relevance of market surveillance

In the EU, goods and services can freely flow across borders. For this reason, market surveillance must have a European dimension and national authorities must be in close coordination and communication to inform each other about their surveillance results. For this purpose, two systems have been established:

- Rapid Alert System (RAPEX)
- Information and Communication System for Market Surveillance (ICSMS).

Suppose a market surveillance authority in any EU country identifies a dangerous non-food product which may also pose a serious risk for other countries. In this case, it alerts other EU Member States through the RAPEX system. All 28 EU countries plus Iceland, Liechtenstein and Norway participate in the RAPEX system.

The IT platform ICSMS shares relevant information on product conformity with other authorities in the EU. The ICSMS is structured into different segments: one for EU institutions, one for market surveillance and customs authorities, and one public segment accessible to everyone.

Principles and processes of market surveillance in Germany

Market surveillance in Europe and Germany follows certain principles in order to be efficient and effective:¹³⁴

- Strategising: all EU countries prepare market surveillance strategies/programmes and update them every four years at a minimum¹³⁵.
- A risk-based approach to determine products, types of checks and scale of surveillance. Risks are assessed based on the product hazard, economic actors' records and consumer complaints.
- Proportionality when taking action to stop non-compliance.
- Involving economic operators and distributors and assigning responsibilities.
- Cross-border cooperation of national authorities through the timely exchange of information and use of available communication systems (RAPEX, ICSMS).

The market surveillance process in the EU and Germany is conducted in different steps:

- Product selection is made either proactive (based on market intelligence, monitoring and cross-border communication (RAPEX, ICSMS)) or reactive (based on non-compliance events and customer complaints).
- Sample collection includes decisions on how to collect, which samples to collect and how many to collect. This decision is influenced by many factors (type of product, related legislation, number of products in the market etc.).

- Compliance assessment includes an initial check of formalities (ICSMS database registration, identification of economic operator, documentation), followed by a formal assessment and a technical assessment.
- Follow-up measures for non-compliance must be proportional to the risk and include achieving compliance, product withdrawal, destruction or alerting end users.
- Sanctions can be imposed on non-compliant economic operators based on national laws, such as the ProdSG.

New challenges in market surveillance

As people buy and sell more products online, authorities must surveil a steadily increasing variety of products. Online trading also makes it increasingly difficult to identify responsible economic operators. Besides, products are delivered in many individual consignments, which are more difficult to control.

To manage these challenges, the EU and Germany started developing new legislation, methods and tools for market surveillance. For instance, since 2021, one economic operator in the supply chain must by law be established in the EU in order to hold somebody accountable. Furthermore, German authorities intensified their collaboration with online market platforms to enable a swift response in case of non-compliance. Germany is also developing artificial intelligence tools to identify potentially dangerous products by scanning online customer reviews. Mounting complaints about the lack of safety of a given product may provide a lead for surveilling this product.

Factory surveillance

Commissioned by the manufacturer before a product is placed on the market, a certification body may initially conduct a factory inspection, followed by factory surveillance at least once a year. If major non-conformance is identified, the certification of products may be suspended. Following this, samples of certified products may be selected for re-examination tests. The certificate holder has full responsibility for the certified product and must inform the certification body of

¹³⁴ ZLS (2017), Good Practices for Market Surveillance, available at [here](#) 

¹³⁵ The current German programme (2021) can be downloaded [here](#): 

relevant changes, e.g. regarding factory location or changes to design.

The factory has full responsibility to ensure that the entire production process for certified products is continuously in compliance. The factory shall exercise adequate control over all sub-con-

tractors and homeworkers preparing product parts or assembling products with safety implications. The factory shall exercise production controls, monitoring and routine tests. In addition, checks for the calibration and functioning of test equipment or measuring instruments used for safety tests are mandatory.

Case study: electric motor

Key concerns with electric motors are both product safety and energy efficiency.

The relevant requirements for energy efficiency are compliance with the EU's ecodesign requirements for electric motors and the related German Ordinance on Ecodesign of Energy-related Products (EVPGV). German federal state authorities jointly oversee market surveillance with BAM in line with the EVPGV. BAM supports the federal state authorities in developing market surveillance programmes and coordinates an information exchange between authorities, the EU Commission and other EU Member States.

During assessment of the ecodesign requirements, the authorities also check formal requirements (ICMCS registration, correct markings, address of economic operator, declaration of conformity, documentation available, traceability aspects etc.) and measure the energy efficiency of the electric motor. If a product sample fails to meet energy efficiency requirements – beyond certain tolerance levels – the authority tests three more samples of the same product to calculate an average value for the motors' energy efficiency.

If formal or technical non-compliances are found, the authorities contact the manufacturer or another available economic

operator to correct the deficiency. Where ecodesign requirements are concerned, authorities rarely issue RAPEX notifications, e.g. because a non-compliant electric motor will not pose a high risk to people's health or the environment.

Another major concern for the electric motor is its safety. Therefore, compliance with both the Low Voltage Directive (LVD) and its German implementation law, the Product Safety Law (ProdSG), is relevant.

The German federal states are responsible for implementing market surveillance to ensure an electric motor meets all product safety requirements. These authorities are divisions of the respective federal state ministries responsible for consumer protection.

Market surveillance can be proactive or reactive. Reactive market surveillance responds to complaints about unsafe electric motors or information about non-compliant products through the ICSMS. Proactive market surveillance actions are planned measures based on market intelligence or RAPEX notifications, consumer complaints or test reports in consumer magazines. Market surveillance measures should align with the focal topics in the German market surveillance strategy/programme, e.g. placing a focus on electrical appliances.



Proactive market surveillance activities for the electric motor are subdivided into several steps:

- Developing a project plan including project topic, rationale, objective, target group, participants, surveillance approach and estimated human and financial resources.
- Sample collection, e.g. 20 electric motors from different producers collected at different sales points.
- Compliance assessment: after the formal assessment (see above), the authority decides if a technical assessment is required – independent of whether this had been planned in the initial project plan or not. If needed, notified third-party conformity assessment bodies may be ordered to support the compliance check.
- In the event of non-conformity, measures are taken proportionate to the assessed risk. Such measures may include product withdrawal, consumer warnings, product recall from end users, encouraging voluntary sales withdrawals or a total sales ban by the authorities.

3.4 Further reading on German QI

BMWK (2021). United in Quality and Safety. An introduction to quality infrastructure in Germany and the European Union for policymakers and trade partners. Available on the BMWK website: [↗](#)

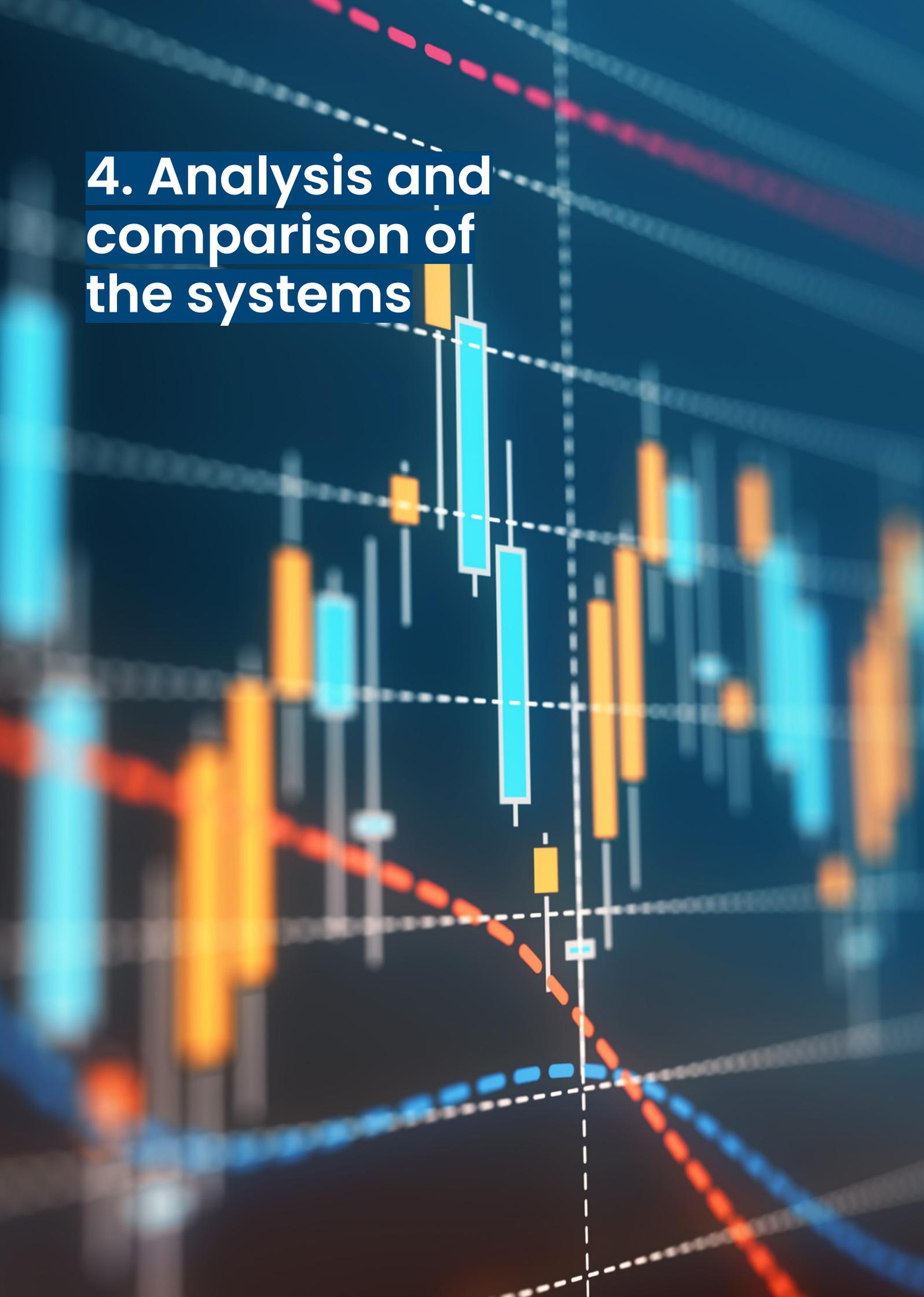
DIN (2021). The Economic Benefits of Standardization. An update of a study carried out by DIN in 2000. The study analyses and illustrates the effects of standardisation on the German economy. Available on the DIN website: [↗](#)

DIN (2016). An introduction to standardization (2016). A practical guide for small businesses. The guide defines important terms and explains fundamental processes in standardisation at the German, European and international level. Available on the DIN website: [↗](#)

EU (2016). The Blue Guide on the implementation of EU product rules. The Blue Guide is a publication by the European Commission that gives a comprehensive overview of EU product rules (e.g. New Legislative Framework, standardisation, conformity assessment, accreditation, and market surveillance). The EU is currently working on an updated version. Available on the EU website: [↗](#)

OECD (2022), Quality infrastructure for innovation in Germany, in OECD Reviews of Innovation Policy: Germany 2022: Building Agility for Successful Transitions, OECD Publishing, Paris, [↗](#)

4. Analysis and comparison of the systems



4.1 Similarities and differences between QI in Indonesia and Germany

4.1.1 Comparison of legal and regulatory frameworks

Germany's legal and regulatory QI frameworks are shaped at different levels. The QI system for ensuring product safety in the EU is harmonised across all Member States, which is an essential foundation of the single market. The EU sets directives and launches direct regulations, which the Member States must transpose into national legislation. The New Legislative Framework (NLF) is a package of EU regulations and decisions to improve the internal market for products. The NLF is legally binding in all EU Member States, including Germany. The NLF works with the proven approach of combining technical regulations (determining the 'what') with voluntary harmonised standards (determining the 'how'). The idea behind combining voluntary standards with mandatory legislation is to facilitate deregulation: the more enterprises self-regulate using standards, the fewer authoritative regulations are needed.

Germany does not have an overarching QI law for all technical QI areas at the national level. Instead, it has an accreditation law, a metrology law and a contractual standardisation agreement. These laws are amended based on the respective EU directives (e.g. legal metrology), or regulations (e.g. accreditation). The federal states in Germany are mandated to perform certain QI tasks, such as market surveillance. They have their own regulations in place for this purpose.

The Indonesian legal and regulatory frameworks in QI are designed differently to those in Germany. In 2014, Indonesia issued Act No. 20/2014 on Standardization and Conformity Assessment. This regulation forms the basis for the planning, formulation, determination, application, enforcement, maintenance and supervision of Indonesian National Standards (SNIs) and conformity assessment activities, as well as the basis for interaction

of the different QI elements in the country. The scope of this legal act is standardisation, accreditation, conformity assessment and (industrial and scientific) metrology. The key actor in the field of Standardization and Conformity Assessment is the National Standardization Agency (BSN). Indonesia's QI system and quality assurance in the production sector are strictly regulated by Act No. 20/2014, and a considerable number of mandatory standards are essentially technical regulations. In April 2023, 302 SNIs were stipulated in technical regulations, thus becoming mandatory¹³⁶. In addition, 140 SNIs were notified to the WTO, since these may be of relevance for international trade and could be considered non-tariff measures (NTM) – see Section 2.3.1. For legal metrology, Indonesia has National Law No. 2/1981. Legal metrology activities are regulated and operated by the Directorate of Metrology, Ministry of Trade.

Indonesia is a member of the Association of Southeast Asian Nations (ASEAN), a regional intergovernmental organisation which is not able to issue laws or regulations applicable to its Member States. Instead, each member country has its own QI legislation in place. The EU is a single market covering the free and borderless flow of goods and services. In the context of ASEAN, there is harmonisation of the QI system (especially standards) at the level of ASEAN member states, which is a joint agreement based on aspects of the needs of members. Dedicated ASEAN committees discuss and agree on harmonising certain QI elements or implementing MRAs on test reports or certificates. These include the ASEAN Consultative Committee for Standards and Quality (ACCSQ) and the ASEAN Food Testing Laboratory Committee (AFTLC).

Apart from having membership in their respective regional organisations – ASEAN and the EU – Indonesia and Germany are members of other international networks, trade agreements and organisations that can influence and, to some extent, align their respective QI framework conditions. Most importantly, both countries have been original World Trade Organisation (WTO) members since 1 January 1995 and benefit from open and rules-based world trade. Hence, the WTO Agreement on Technical Barriers to Trade (TBT

¹³⁶ BSN – Badan Standardisasi Nasional. (2021, March 5). *Regulasi Teknis (SNI Yang Diwajibkan)*. BSN. 

Agreement) determines the formulation and notification of technical regulations in both countries.

In conclusion, the legal and regulatory frameworks for QI in the two countries differ. Germany has no overarching QI law, rather single laws for each QI component. These laws and other QI-related regulations are influenced by EU legislation in the interest of the EU single market. Indonesia has one overarching QI law, complemented by a legal metrology law. Its membership of ASEAN does not directly influence its QI legislation (or any other legislation), but it can enter into agreements as part of regional harmonisation within ASEAN. Furthermore, the EU – and thus Germany – increasingly rely on combining voluntary standards and regulations to ensure product safety. In Indonesia, mandatory standards are the instrument of choice to ensure product compliance with safety and health requirements.

4.1.2 Comparison of Indonesian and German standardisation

The recognised standardisation bodies in Germany are the German Institute for Standardization (DIN, Deutsches Institut für Normung) and the German Commission for Electrical, Electronic and Information Technologies of DIN and VDE (DKE, Deutsche Kommission Elektrotechnik Elektronik Informationstechnik in DIN und VDE). Meanwhile, Indonesia's recognised standardisation body is the National Standardization Agency (BSN). The principles for the development of standardisation in both countries have been set out in guides which refer to international standardisation provisions. Standard requirements are obtained from individual proposals or other stakeholders. Funding for standardisation activities at DIN and DKE is obtained from sources of income through the sale of standards, public and private funds and membership fees. Meanwhile, BSN's main funding source for standardisation activities comes from the government budget, although it also obtains a small portion of its income from the sale of standards.

Up to 2021, DIN facilitated the development of nearly 35,000 standards by involving more than 36,000 experts in working committees. Interested

organisations or individuals are entitled to participate in the technical committee but must pay a fee when joining the DIN committee. This provision differs from Indonesia, where the participation of experts or organisations in technical committees is free from membership fees. As of December 2022, 14,611 SNIs have been developed. In 2019, 50% were developed by adopting identical or modified international standards, involving more than 2,000 experts in technical committees. Accordingly, Indonesia's share of purely domestic standards is 50%. In Germany, DIN and DKE (responsible for electrotechnical standardisation) recognise the primacy of international standards in Germany/Europe and are active contributors to international standardisation. 85% of standardisation projects at DIN and 95% in DKE are of European or international origin. That means that only 15% (DIN) and 5% (DKE) of German standards are not based on European or international standards.

There are fast-track mechanisms for developing standards in Germany and Indonesia. In Germany, DIN and DKE can create specifications (SPECS) that are developed rapidly. SPEC development can take a few weeks to a few months, but certainly less than a year. In Indonesia, BSN also determines the SNI development mechanism for urgent needs in a fast-track mechanism.

The adoption of standards in both countries is voluntary. By contrast, technical regulations in Germany are legally binding prescriptions and must be applied by all economic actors in the market. Technical regulations targeting safety, health and environmental protection are developed by the public sector, especially ministries and other public authorities, which are mandated to develop regulations. As standards are voluntary, the German Government avoids adopting standards into regulations. This differs from the policy in Indonesia, where the Government can compulsorily enforce certain SNIs through the issuance of technical regulations by ministries and other government agencies. Products that do not comply with mandatory SNI provisions become prohibited. Such regulations are stipulated for activities or products with a high level of risk, so regulating production activities and distribution of

these products is deemed necessary. In this case, the Indonesian Government needs to be careful to avoid the negative impact of implementing mandatory SNIs on market competition, innovation and SME development. A recent World Bank study on non-tariff measures (NTM) in Indonesia identified mandatory certification with some SNIs as one of the four most burdensome measures for Indonesian importers and exporters.¹³⁷

In conclusion, both countries have organisations legally recognised by their respective governments to facilitate and manage standardisation activities. In Indonesia, the Government supports the budget for standardisation activities, while in Germany the standardisation budget is primarily financed through revenues from the sale of standards. Germany has developed three times more standards than Indonesia. In addition, the number of experts involved in technical committees is three times higher in Germany.

The time taken to develop a standard does not vary much between the two countries, including the time required for fast-track standard development, such as SPECS. Even though the application of standards in both countries is voluntary in principle, in Indonesia standards can be enforced compulsorily through respective technical regulations.

4.1.3 Comparison of metrology and legal metrology in Indonesia and Germany

In Germany, the National Metrology Institute PTB and its predecessor PTR (founded in 1887) were established and expanded in a close cooperation between the government, industry and science. PTB is responsible for all three scientific, legal and industrial metrology areas. In Indonesia, the national metrology institute SNSU-BSN was the result of a reorganisation of the National Standards Institute (BSN) involving the introduction of a new structure in 2018, the Deputy for the National Standard Measuring Unit (SNSU). SNSU-BSN is in charge of scientific and industrial metrology,

while the Ministry of Trade, through the Directorate of Metrology, is responsible for legal metrology. SNSU-BSN and PTB ensure the traceability chain of measurements in their respective countries.

With the signing of the Metre Convention in 1875, Germany was among the pioneers of international metrology and the international system (IS) of measurements. In 1960, Indonesia signed the Metre Convention, becoming a full member of the General Conference on Weights and Measures (CGPM) and benefiting from its MRA scheme to catalogue its measurement capabilities and receive peer reviews regularly. BSN has entered into MRAs with APMP at the regional level and BIPM at the international level, so that the results of measurements or calibrations performed by SNSU-BSN can be accepted in all APMP and BIPM member countries. The same applies to Germany, given its regional membership of EURAMET and international membership of BIPM.

Table 6 in Section 2.3.2 shows that the calibration and measurement capabilities (CMCs) in both countries are on considerably different levels of development. In 2022, Germany listed 1,458 internationally recognised CMCs, while Indonesia reached only a tenth of this number (146). Indonesia needs to develop more CMCs in all areas, particularly in the measurement fields of Chemistry and Biology (QM), Length (L), Ionizing Radiation (RI) and Photometry and Radiometry (PR). Photometry and Radiometry CMCs are relevant to the solar energy sector; hence, these capabilities would support the energy transition.

Germany's network of accredited secondary calibration laboratories comprised 504 CABs in 2021. In contrast, this network in Indonesia consists of 361 CABs, all of which recalibrate their devices at PTB or SNSU-BSN, respectively. This shows that the secondary market for calibration services is widely developed in both countries.

Both countries are active members of the International Organization of Legal Metrology (OIML) for adopting international recommendations, primarily related to trade transactions and harmonisation, and of the OIML certification system (OIML-CS) for regulated measuring instruments.

¹³⁷ World Bank (2023). 

In addition, the OIML-CS targets international harmonisation of technical requirements for regulated measuring instruments.

Another similarity between the two countries is that verification and re-verification of regulated measuring instruments happens at a lower administrative level and is performed by responsible sub-national agencies. These are legal metrology units (UML) at regency (district) or municipal offices in Indonesia. In Germany, the federal states operate legal metrology units under the respective state ministries. One difference is that the producers of measurement standards in Germany are required to perform a voluntary conformity assessment before the instrument is placed on the market. Only after it has been placed on the market is verification regularly conducted by the authorities. By contrast in Indonesia, several measuring instruments must be checked and re-tested before entering the market through a process of factory inspection, testing and marking verification. As for other measuring instruments, a voluntary conformity assessment is carried out only after they have been marketed; routine verification is carried out by the authorities.

In conclusion, both countries have developed metrology systems connected to and recognised by the international alliances of metrology and legal metrology. The German metrology system and institutions have a much longer history. This, together with the highly demanding nature of German industry, means a significantly higher number of measurement capacities in Germany compared to Indonesia. Industry in both countries is served by a large network of secondary calibration laboratories. Sub-national legal metrology units verify regulated measuring instruments to protect consumers and the environment. The NMIs in the two countries are structured differently and embedded in the overall institutional QI structure. Legal metrology is under a different lead agency in Indonesia than the other metrology fields. In Germany, PTB plays a lead role in all three areas.

4.1.4 Comparison of conformity assessment and accreditation in Indonesia and Germany

Both countries have a large number and wide range of conformity assessment bodies (CABs) for testing, inspection and certification, particularly product and management certification. The availability of CABs in Indonesia is particularly high in industrialised provinces like West Java, East Java, Banten and Jakarta. In Germany, conformity assessment bodies are distributed across the country, since German industries are also evenly distributed across the various regions and the federal system mandates specific tasks to the federal states.

German companies must initiate conformity assessment by themselves if they intend to place certain products on the market. After a successful conformity assessment, German businesses can demonstrate their products' conformity by attaching a CE mark through a self-declaration. CE marking is mandatory for products covered by EU harmonisation, e.g. high-risk products or measuring instruments subject to legal metrology. The CE mark's target groups are the national regulatory authorities, not consumers.

In Indonesia, conformity assessment activities are performed by the CAB, a legal entity that complies with Indonesian laws and regulations and is accredited by KAN. Issuance of certificates for products (goods and services), systems, processes or personnel that have met the reference requirements, can be followed by issuance of evidence of conformity in the form of a certificate of approval for using the SNI mark/Surat Persetujuan Penggunaan Tanda SNI (SPPT SNI). SPPT SNI is the basis of approval for using the conformity mark, namely the SNI mark. Meanwhile, surveillance activities include pre-market surveillance, e.g. factory inspection, and market surveillance. The role of state surveillance authorities is more pronounced in the Indonesian QI system. Enterprises that successfully carry out mandatory or voluntary SNI conformity assessments are allowed to include the SNI mark on their products.

Both countries operate a variety of country-specific conformity marks. A typical example from

Indonesia is the Timber Legality Assurance System (SVLK), which ensures the legality, traceability and sustainability of forest production. The SVLK is based on a regulation by the Ministry of Environment and Forestry, not on a standard. In Germany, a typical example of a conformity mark initiated and run by the Federal Ministry of Economic Cooperation and Development (BMZ), a public sector body, is the Green Button, which assures the sustainability of textile production. Another example of a voluntary certification mark is the GS mark (Tested Safety) for technical equipment, which requires state notification of all CABs involved.

CABs provide conformity assessment services in regulated and non-regulated areas in both countries. For performing such services in regulated areas, the responsible authority must notify the CAB. In order to receive notification in Germany, it is a great advantage to be accredited first. In Indonesia, CABs are accredited according to their scope and appointed by the responsible ministry to conduct conformity assessments in regulated areas.

In both countries, accreditation is recognised as proof of the competence and impartiality of conformity assessment bodies, regardless of whether they offer their services before or after a product is placed on the market. Through their membership in international accreditation alliances, the German accreditation body (DAkkS, Deutsche Akkreditierungsstelle) and the Indonesian National Accreditation Body (KAN, Komite Akreditasi Nasional) pursue the same principles: independence, impartiality and non-profit operation.

Although KAN and BSN are two separate institutions in Indonesia in terms of their duties and functions, they are closely related in terms of organisational structure and budget. The Indonesian Presidential Decision No. 78/2001 stipulates that the BSN chairman acts as KAN chairman concurrently, and the deputy head of the BSN Accreditation Division also holds the position of KAN secretary. Furthermore, KAN programmes and activities are funded under the BSN budget. Indonesia chose to combine standards development and accreditation activities by not carrying

out conformity assessment activities (certification, testing, inspection). This entanglement of positions and management in both organisations could constrain KAN's independence in implementing its functions even though, national actors consider this setup more effective for coordinating and following up QI activities. In Germany, DAkkS is completely independent of DIN, PTB and conformity assessment bodies with regard to personnel and organisational structures.

In terms of their number of national accreditation bodies (NABs), Indonesia and Germany are in line with good international practice. In 2010, Germany implemented the legal provisions of the EU by merging the previous ten accreditation bodies into one national accreditation body (DAkkS). Indonesia has been operating one national accreditation body since 1992.

The accreditation bodies in both countries offer accreditation in almost all internationally available accreditation schemes. KAN in Indonesia still needs to develop its accreditation services to reference material producers in accordance with ISO 17034:2016 and biobanking facilities in accordance with ISO 20387:2018. DAkkS in Germany must also expand its accreditation service portfolio to biobanking facilities.

A common international reference framework applied by both countries is the ILAC Mutual Recognition of Arrangement (MRA) or the IAF Multilateral Recognition Arrangement (MLA) on accreditation services, to ensure that product tests or certifications (by an accredited CAB) in one country are also recognised in another country. Memberships in EA, ILAC and IAF (Germany) and APAC, ILAC and IAF (Indonesia) establish the same overarching accreditation framework for both countries.

In conclusion, both countries have vibrant markets for conformity assessment services. Large numbers of CABs offer services in regulated and non-regulated quality assurance areas. The CABs must be officially notified by authorities to perform their services in the regulated area. In Indonesia, accreditation is a pre-condition for notification of CABs. The Ministry of Industry has authority over the industrial sectors and can appoint

certain types of CABs, even if they are not yet accredited in the appropriate area but in a related area, under specific conditions as per MoI Regulation No. 45 of 2022. The validity of appointment is two years. In Germany, accreditation represents a strong advantage for official notification, but it is not a necessity. Both countries operate one independent national accreditation body and pursue the same universally valid accreditation principles. Both KAN and DAkKS offer services in almost all accreditation schemes. However, both organisations still need to develop biobanking accreditation.

4.1.5 Comparison of market surveillance and product safety in Indonesia and Germany

Product surveillance (especially standardised products) in Indonesia consists of two main parts: pre-market and market surveillance. The Ministry of Industry (MoI) carries out pre-market surveillance in factories (for SNI implementation in the industrial sector) and the Directorate General of Customs and Excise (Ministry of Finance) in customs areas for imported products. Meanwhile, through coordination with relevant agencies, market surveillance is carried out by the Directorate of Supervision of Circulating Goods and Services (Ministry of Trade). In Germany, product surveillance can be conducted in the pre-market area and in markets, coordinated at the national level by the Federal Ministry for Economic Affairs and Climate Action (BMWK). However, product surveillance in the EU is usually carried out after the product is available on the market. As an EU Member State, Germany follows EU laws. It participates in the harmonised single market monitoring mechanism, ensuring that goods and services can flow freely across EU country borders. In the absence of a single ASEAN market, such a mechanism does not apply to Indonesia.

Product surveillance at the factory (pre-market) in Germany is usually commissioned by the manufacturer or its clients (not the authorities) to obtain certificates or check conformance with customer requirements in value chains. Market surveillance in Germany uses a proactive or reactive strategy. Proactive oversight is performed

on products based on market intelligence, monitoring and cross-border communication systems (RAPEX, ICSMS) or in a reactive way based on incidents of non-compliance and customer complaints. Reactive market surveillance is a response to external events involving a particular product. Meanwhile, pre-market product surveillance in Indonesia is carried out regularly, based on an annual surveillance plan, and under special surveillance schemes, based on reports from the public, business actors and/or related agencies and evaluated import data and/or commodity balances. Given Indonesia's vast territorial dimensions, surveillance is carried out at district level. If a product is found to be non-compliant with trade rules, reports will be submitted in stages, from district level to provincial level and ultimately to national level.

BSN is involved in market surveillance for SNI-certified products by evaluating the effectiveness of SNI implementation by sample checking the SNI's conformity in coordination with ministries/non-ministerial government agencies. The public can help with monitoring and reporting through recognised organisations in Germany and Indonesia. In addition, certification bodies play a role in supervising products on the market through surveillance activities carried out on a regular basis for clients wishing to re-obtain certification. Both countries impose sanctions on business actors who commit non-compliance through fraud, counterfeiting and violating national laws.

In conclusion, Germany and Indonesia have the legal authority to conduct product and market surveillance activities. Market surveillance activities are carried out in a similar manner, including pre-planned surveillance (proactive or regular) and surveillance in response to an incident (reactive or special). In Germany, product surveillance mostly takes place on markets, while in Indonesia, surveillance occurs equally before and after a product enters the market.

4.2 Future opportunities and challenges for QI in Indonesia and Germany

Key points in this section:

- **Digitalising QI can help improve product and service quality, reduce costs and enhance customer satisfaction**
- **QI for digitalisation is a response to the transformation of the way products are designed, manufactured and delivered in the digital age**
- **Germany and the EU are committed to supporting QI digitalisation**
- **Two important multistakeholder initiatives in Germany support the digitalisation of QI: the German Standardization Roadmap on AI and the QI Digital consortium.**
- **QI competence and services can strongly support the transformation towards a sustainable, climate-smart economy**
- **QI can support achieving the SDGs, particularly with regard to people, planet and prosperity**
- **With a focus on planet, QI contributes to achieving SDGs 12, 14 and 15**
- **In Germany, DIN, DKE and VDI have drawn up a Standardization Roadmap Circular Economy**
- **DKE is committed to creating an all-electric society fuelled by regenerative energy sources. Electrotechnical standardisation can support and accompany this effort.**
- **Indonesia develops QI for the digital sector by adopting international standards and accrediting the Conformity Assessment Institute (LPK) in the field of information security**

4.2.1 Digitalisation of QI and QI for digitalisation

The digitalisation of QI involves using digital technologies and tools to improve the efficiency, effectiveness and accuracy of quality assurance. This includes data collection, analysis, reporting and decision-making. Digitalisation in quality infrastructure can be implemented in different ways.

- Digital quality management systems (QMS): QMS software enables organisations to electronically manage quality processes such as document control, audits, corrective actions and risk management. It also helps to improve consistency and efficiency and reduces the likelihood of errors and omissions.
- Remote certification and accreditation involve the use of digital technologies to conduct audits, inspections and assessments remotely without the need for a physical presence.
- Internet of Things (IoT) and sensor technologies: IoT devices and sensors can monitor quality parameters such as temperature, humidity and pressure in real time. This can help detect deviations from desired quality standards and take corrective actions instantly.
- Artificial Intelligence (AI) and machine learning (ML): AI and ML can analyse large volumes of quality data and identify patterns, trends and anomalies. This can help with the early detection of quality issues and the prediction of potential problems.
- Blockchain technology: Blockchain can create an undisputable record of quality data, accessible to all stakeholders in the supply chain. This can help to improve transparency, traceability and accountability.

On the other hand, quality infrastructure must adapt to industry digitalisation to ensure that products and services meet the required quality standards, are safe and perform as expected (QI for digitalisation). QI adaptation to industry digitalisation may include:

- developing and updating standards and regulations reflecting the requirements of the digital economy;
- developing and implementing testing and certification programmes for digital products and services;
- developing and implementing calibration and measurement programmes reflecting the requirements of the digital economy;
- developing and implementing inspection and accreditation programmes addressing the needs of the digital economy;
- developing and implementing education and training programmes for professionals working in the digital economy.

Examples of new QI services for sectors that digitalise are artificial intelligence in the medical sector, reliable hydrogen filling stations and additive manufacturing (3D printing)¹³⁸.

Based primarily on voluntary standardisation, the EU approach to product legislation is flexible and can adjust quickly to changing conditions and technologies, such as acceleration in industrial digitalisation. At the same time, Germany and the EU are committed to supporting the digitalisation of quality infrastructure. Three examples are described below.

Goal 3 of the German Standardization Strategy¹³⁹ brings future-oriented topics into standardisation. It proposes new coordination processes and open platforms in standards setting, particularly with regard to future topics such as Smart Cities, Industry 4.0 and the energy transition, all of which require broader stakeholder involvement. This goal is supported by the digitalisation of standards setting and use of open-source methods and technologies in standardisation.

The QI Digital consortium¹⁴⁰, jointly founded in 2021 by BAM, DAkkS, DIN, DKE and PTB and supported by BMWK, aims to advance the digitalisation of quality infrastructure. The consortium focuses on developing digital solutions and services to improve QI efficiency and effectiveness in Germany and internationalise the standardisation process. The work includes developing digital tools and platforms for certification, accreditation, testing and inspection and formulating standards and guidelines for digital quality infrastructure (see the list of examples in the first paragraph of this sub-section).

The German Standardization Roadmap¹⁴¹ on AI is a strategic document that outlines Germany's approach to developing and implementing standards for AI. The roadmap was developed by DIN jointly with DKE and BMWK and with the support of 300 experts from industry, science, the public sector and civil society. The aim of the roadmap is the timely development of a framework for developing standards that can support innovation, competitiveness and safety and reliability of AI systems, and thus support the international competitiveness of German industry.

In Indonesia, the 2020-2024 National Medium-Term Development Plan stipulates a digital transformation programme as one of the main programmes, along with an innovative and adaptive form of development, so that it can become a catalyst for moving towards a prosperous and just society. Mainstreaming digital transformation is used to optimise the role of digital technology in increasing the nation's competitiveness and is one of the sources of Indonesia's economic growth¹⁴².

Economic transformation towards a digital economy requires adequate quality infrastructure, including standards, conformity assessment and metrology, to ensure information security and guarantee the quality of information technology services. Following its roles and responsibilities, BSN ensures that SNI formulation, the SNI implementation scheme, CAB accreditation and metrology can be carried out in accordance with the Government's time target. BSN has operated an information security certification and accreditation system

¹³⁸ *QI-Digital*. QI Digital. (n.d.).

¹³⁹ *German standardization strategy*. DIN. (n.d.-a).

¹⁴⁰ *OECD Reviews of Innovation Policy: Germany 2022*. OECD-ilibrary (2022).

¹⁴¹ *German Standardization Roadmap on Artificial Intelligence*. (2020).

¹⁴² *RPJMN Indonesia*

based on SNI ISO/IEC 27001:2013 and established an information security management system.¹⁴³

The priority scale of the national standardisation strategy is carried out by encouraging national product access to global markets through quality and productivity improvements. In addition, it also takes advantage of opportunities to develop regional economic agreements and free markets, as well as creative and digital economies. Indonesia continues to develop quality infrastructure for the digital sector by adopting international standards and accrediting the CABs in the field of information security management¹⁴⁴. Standardisation and conformity assessment activities continue to focus on developing digital solutions and services to increase the efficiency and effectiveness of QI in Indonesia. The work includes web-based services for calibration, web-based services for ordering standard documents and standardisation and metrology training services¹⁴⁵, and a digital platform for accreditation services¹⁴⁶. QI facilities in the field of information and communication technology are urgently needed to face the digital era, so the 2020–2024 BSN Strategic Plan¹⁴⁷ sets out a strategy for strengthening and improving infrastructure quality in the field of information and communication technology.

4.2.2 QI for sustainable development

The world is facing the challenge of a fundamental transformation towards a climate-neutral and regenerative economy. QI competence and services can strongly support this transformation towards a sustainable, climate-smart economy.

New technologies need technical standards and conformity assessment tests to be widely introduced and accepted.

Quality infrastructure can support economies in achieving the Sustainable Development Goals (SDGs). QI contributes mainly to improving three dimensions addressed by the SDGs: **people, planet** and **prosperity** (besides the other two, **peace** and **partnerships**).¹⁴⁸

With regard to **planet**, QI contributes to conserving and protecting nature and the environment. Measurement and verification of compliance contribute to the sustainable use of marine resources (Life below water/SDG14) and the protection of ecosystems (Life on land/SDG15). QI provides accurate information on the materials, energy, water and land used for production and consumption, which is needed to reduce energy, material intensity and related emissions and waste. It thus supports the transition to eco-friendly policies and behaviour. To this end, QI enables people to consume and produce more responsibly (SDG12) and responds to the challenges of a circular economy.

ISO has developed a range of standards in its efforts to work towards SDG12¹⁴⁹ Responsible consumption and production, including ISO 20400 on sustainable procurement, a standard on environmental labelling within the ISO 14020 series, ISO 26030:2019 on social responsibility and sustainable development in the food chain, ISO 15392 on sustainability in building construction and ISO 20245 on the cross-border trade of second-hand goods. The aim of these standards is to reduce waste, curb environmental impact and promote a circular economy.

In Germany, DIN, DKE and VDI are working on standardising the circular economy¹⁵⁰ by drawing up a Standardization Roadmap Circular Economy. The roadmap aims to provide a stocktaking of the status and progress of standardisation in the circular economy, to describe requirements and challenges for seven relevant topics¹⁵¹ and to identify and formulate concrete needs for action for future standards. Transitioning to a circular economy is particularly important for achieving the objectives of the European Green Deal¹⁵² and the Climate Protection Act¹⁵³. The circular economy needs new

¹⁴³ Renstra BSN 2020–2024 

¹⁴⁴ BSN - Badan Standardisasi Nasional. (2022, October 18). *Pentingnya Standardisasi dalam menghadapi tantangan di bidang digital*. BSN. 

¹⁴⁵ Press release No. 855/BSN/B3-b3/05/2022, 

¹⁴⁶ Akreditasi Online. KAN. (n.d.). 

¹⁴⁷ BSN Strategic Plan 2020–2024, 

¹⁴⁸ See QI4D blogpost from August 2020: 

¹⁴⁹ Responsible consumption and production. ISO. (n.d.-c). 

¹⁵⁰ Standardization Roadmap Circular Economy. DIN. (n.d.-c). 

¹⁵¹ Electrical engineering and ICT, batteries, packaging, plastics, textiles, buildings & municipalities, and digitalisation/business models/management. The seven topics correspond to the focus topics of the EU's Circular Economy Action Plan.

¹⁵² The Green Deal is a policy of the European Union aiming to become the first climate neutral continent by 2050.

¹⁵³ With the amendment to the Climate Change Act, the German Government intends to tighten climate regulations and enshrine in law the goal of achieving greenhouse gas by 2045. The aim is to reduce emissions by 65 percent of 1990 levels by 2030.

and revised technical regulations and standards to achieve ambitious climate protection goals.

Since January 2022, the Standardization Roadmap has been developed in seven working groups by representatives from business, science, the public sector, civil society and circular economy experts. The Circular Economy Advisory Board of DIN and DKE in the Environmental Protection Coordination Office coordinates work on the Standardization Roadmap.

DKE embarked on an ambitious effort to create an all-electric society¹⁵⁴. The all-electric society envisions a world in which regeneratively generated electrical energy is economically accessible for everybody as the primary form of energy, sustainably powering society's growth. The all-electric society is DKE's guiding principle for the future. Conversion of today's fossil-fuelled applications to electric and carbon-neutral energy sources and efficient energy management are key prerequisites for this. For DKE, electrical and information technology is crucial to solving the global climate crisis. Accordingly, all economic and societal sectors must be digitalised, automated and electrified, and ultimately coupled with each other to optimise energy efficiency across the system. Electrotechnical standards would make all this possible. Three levers would drive this endeavour: (1) an independent and neutral exchange platform, (2) standardisation of a sustainable energy system, and (3) creating digital standards (SMART standards).

In Indonesia, the 2020–2024 National Medium-Term Development Plan has mainstreamed the Sustainable Development Goals (SDGs) in the main development programmes. In Indonesia, all parties are aware of the importance of QI as a

tool to protect society and the environment and increase the nation's competitiveness.¹⁵⁵

UNIDO's Quality Infrastructure Survey for Sustainable Development Index (QI4SD) shows the readiness of quality infrastructure to support the SDGs. The 2022 QI4SD findings show that Indonesia is able to outperform many other ASEAN countries and is only one level below Singapore¹⁵⁶. Indonesia's quality infrastructure ranks 2nd in ASEAN, 6th in East Asia and the Pacific, 10th in the APEC group of countries and 34th in the world out of a total of 137 surveyed countries.¹⁵⁷

In supporting the implementation of sustainable development, BSN has established SNI ISO 37120-2018 on sustainable urban and community development. This SNI is the basis for the implementation of smart cities and contains indicators relating to urban services and quality of life¹⁵⁸. BSN also established SNI ISO 37122:2019 on Sustainable cities and communities – Indicators for smart cities. In addition, the Ministry of Industry passed Minister of Industry Regulation No. 51/2015 concerning Guidelines for Formulating Green Industry Standards. The Green Industry Standard is a reference for industry players in developing a consensus on raw materials, auxiliary materials, energy, production processes, products, business management, waste management and/or other aspects that aim to create a green industry¹⁵⁹. BSN, through KAN, provides support by developing LPK accreditation relating to the scope of Green Industry Certification Institutions and certification bodies for Green House Gas (GHG) certification. In supporting the SDGs, the Ministry of Environment and Forestry coordinates and formulates, develops and assesses the conformity of instrument standards in the environmental and forestry sector through the Agency for Standardization of Environmental and Forestry Instrument (BSILKH). BSILKH deals with aspects of environmental quality, sustainable forest management, resilience to ecological disasters and climate change, as well as facilitating the application of environmental and forestry instrument standards. In supporting the development of SNIs, BSILKH is registered as a standard development technical committee at BSN for forestry and the environment. BSILKH also operates a conformity assessment body¹⁶⁰.

¹⁵⁴ DKE. (2022b, August 17). *The vision of the All-Electric Society: The DKE positions itself as a pioneer*. VDE. [↗](#)

¹⁵⁵ Strategi Standardisasi Nasional [↗](#)

¹⁵⁶ *Quality Infrastructure for Sustainable Development Index*. UNIDO. (n.d.). [↗](#)

¹⁵⁷ BSN – Badan Standardisasi Nasional. (2023, March 11). *Infrastruktur Mutu Indonesia Siap Dukung ASEAN Jadi Epicentrum of Growth*. BSN. [↗](#)

¹⁵⁸ Rizqi, A. N. (2019, October 10). BSN Siapkan SNI Untuk Smart City. *Bisnis.com*. [↗](#)

¹⁵⁹ Regulation of the Minister of Industry, No. 51/2015: Guidelines for Preparing Green Industry Standards. [↗](#)

¹⁶⁰ Profil BSILKH. Badan Standardisasi Instrumen Lingkungan Hidup dan Kehutanan. (n.d.). [↗](#)

In addition, Presidential Regulation No. 44/2020 concerning the Indonesian Sustainable Palm Oil Certification System and Minister of Agriculture Regulation No. 38/2020 concerning Implementation of the Certification of Indonesian Sustainable Palm Oil Plantations, regulate the principles, criteria and indicators for sustainable palm oil production in Indonesia which must be fulfilled by palm oil producers to obtain ISPO certification. Indonesian Sustainable Palm Oil (ISPO) is a sustainability certification to ensure that palm oil production in Indonesia is carried out in a sustainable and responsible manner. BSN, through KAN, plays a role in providing the CAB accreditation scheme in assessing compliance with the applicable ISPO regulations¹⁶¹.

In line with the aim of standardisation, implementation of SNIs supports the process of forming a circular economy in Indonesia using the functionality of SNIs to increase protection for consumers, business actors and the public in terms of safety, security, health and environmental sustainability¹⁶². Currently, through technical committees focusing on environmental management, BSN develops SNIs in the environmental sector with a focus on environmental management systems and supporting tools for sustainable development, environmental protection, environmental economics (including sustainable development), environmental impact assessment (including risk management), ecolabels, product life cycle, re-processing (recycling) and other standards relating to environmental protection¹⁶³.

¹⁶¹ *Direktori Klien LSISPO*. KAN. (n.d.-b). 

¹⁶² Undang – Undang No. 20/2014 Standardisasi dan Penilaian Kesesuaian

¹⁶³ BSN (2020). *Standardisasi Sebagai Penyokong Pembentukan Ekonomi Sirkular di Indonesia*. 

5. Conclusions and recommendations



Quality infrastructure (QI) is a crucial service sector that supports the growth and development of various industries and technologies. However, the QI that measures, tests, inspects and certifies these industries and their products must constantly keep pace with the rapid advancement of technology in recent decades. The status of technology, industries and supporting QI varies significantly between countries, as demonstrated by this study's comparison of German and Indonesian models. It is therefore essential to continually review and upgrade the QI in each country to ensure that it remains effective, efficient and relevant to the needs of industries and society.

The QI systems in Indonesia and Germany have unique development trajectories, with a history of past accomplishments, current performance and future aspirations. By comparing these trajectories, we are able to understand how the integral support sector for quality infrastructure can develop under specific conditions, stakeholder expectations and political and regulatory settings. This comparison also presents an opportunity for mutual learning. How did Germany make such advancements in quality infrastructure and become a global leader in the field, and can this experience be applied by other countries to different contexts? How did Indonesia catch up so quickly with advancements in the QI systems of other countries, and can this approach to fast-tracked development be replicated elsewhere? If so, under what conditions?

The study sheds light on inspiring practices and future demands. These can be used to make recommendations for both countries. After collection and analysis of the data, important recommendations are formulated to improve the QI systems. Certain recommendations apply to both countries, while others are tailored to the specific concerns of a particular country.

- Both countries should update standards and technical regulations to reflect the needs of the **digital economy**, such as artificial intelligence (AI) in medical and additive manufacturing (3D printing).

- In the context of digitalisation, QI institutions should share experiences on this topic. Indonesia could benefit from ongoing European or German initiatives, such as the German Standardization Roadmap on AI (a strategic document outlining Germany's approach to developing and implementing standards for AI) and the QI-Digital consortium (advancing the digitalisation of quality infrastructure) – see Section 4 for details. Increasing efforts to **digitalise QI** and make it more effective and efficient by utilising state-of-the-art technologies will be crucial for its success and international recognition.
- A recent World Bank study on non-tariff measures (NTM) in Indonesia has identified mandatory certification with some SNIs as one of the four most burdensome measures for Indonesian importers and exporters. In Germany, the only mandatory technical regulations are those that target human health and safety and environmental protection. These regulations determine the 'what' with regard to process or product conditions, whereas voluntary harmonised standards propose 'how' to achieve this. Therefore, with a view to the potential impact on market competition, innovation, and SME development, Indonesia should reconsider how many SNIs it should implement as mandatory. Meticulous regulatory impact assessments carried out prior to the launch of a standard should be used to determine whether an SNI must be mandatory or voluntary; all SNIs should be reassessed at 5-year intervals.
- Indonesia needs CMCs in many technical fields. Hence, the recommendation is to **develop calibration and measurement capabilities (CMCs) for metrology** in all areas, but particularly in the measurement fields of Chemistry and Biology (QM), Length (L), Ionizing Radiation (RI) and Photometry and Radiometry (PR). Photometry and Radiometry CMCs are particularly relevant to the solar energy sector. As Indonesia has recently become a Joint Energy Transition Partnership (JETP)¹⁶⁴ country, developing renewable energy, including solar power is crucial to

meeting JETP requirements and the country's international climate obligations. The national QI system – in particular metrology, testing and standardisation – needs to be ready to service a rapidly expanding PV sector in the future.

- **Exchange** is recommended on attempts to develop QI services for a **circular economy** and the **energy transition**. Both countries are forging ahead with the development of circular economies in industry, society and quality infrastructure. While Germany is working on standardising the circular economy by drawing up a standardisation roadmap and setting up a Circular Economy Advisory Board for DIN and DKE, Indonesia is developing and implementing SNIs that support the process of creating a circular economy (see Section 4.2.2.). A continuous exchange on how QI can best support transformation towards a circular economy would be fruitful for both countries. Another similarly important concept is the energy transition, which gained renewed attention in Indonesia through its participation in JETP. Germany has lengthy experience in coal phase-out due to an industrial restructuring process that began long before the need to decarbonise the energy sector. In recent years, however, both countries started transforming their energy sectors from fossil fuels to renewable energies such as solar, wind and biomass. The technologies that generate, distribute and consume renewable energy need quality assurance services. Hence, regular dialogue on how to address QI challenges arising from the energy transition could be of great value to both countries.

- Both countries are advised to develop **additional accreditation services**. While Indonesia needs accreditation services that target **reference material producers** in accordance with ISO 17034:2016, both Indonesia and Germany must develop and offer the service to accredit **biobanking facilities** in line with ISO 20387:2018.
- In Section 4.1.4, **KAN and BSN** were described as being closely related in terms of organisational structure and budget. There is an **interdependence** between the organisational structures of the two institutions and their funding. ISO 17011, the international standard setting out general requirements for accreditation bodies, addresses the issue of independence to prevent conflicts of interest and maintain credibility in the accreditation process. The standard defines independence: 'Accreditation bodies must be free from any undue influence or conflict of interest, either internal or external, that could jeopardise the impartiality of their accreditation activities. This independence is essential to maintain trust in the accreditation process and the results it produces.' In terms of structural independence, it goes on to say: '[...] the organisational structure of the accreditation body [...] should be set up in a way that minimises conflicts of interest'.

The relationship between these two organisations has the potential to influence KAN's independence in carrying out its functions, if BSN also carries out conformity assessment activities (certification, testing, inspection). The ideal concept of separating standards development institutions, metrology institutions and accreditation institutions as three separate government institutions is a long-term target in line with increasing coordination between government institutions in Indonesia.

¹⁶⁴ Just Energy Transition Partnerships aim to bridge the gap between developed and developing nations in moving towards clean energy. South Africa, Indonesia, and Viet Nam are the first countries to receive funding. Essentially, JETP is a financing mechanism. In a Partnership, wealthier nations fund a coal-dependent developing nation to support the country's path to phase out coal and transition towards clean energy, while addressing the social consequences 

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