

# Technological Progression and Urgency of Regulatory Amendment on Legal Metrology

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**Abstract:** Law Number 2 Year 1981 concerning Legal Metrology (UUML) is aimed at ensuring verifiable measurement and legal certainty of measurement in activities related to transaction justice, public health, environmental protection, and safety. Both of these activities basically have to be recognized internationally and truthfully. The purpose of this study is to find out how rapidly evolving technology becomes an urgency in encouraging countries to improve the metrological regulations. This research is legal research, with normative juridical approach. Data obtained through the library research. UUML was born at the time of unknown information system as reliable as it is today. Starting from the measurement technology is more effective, efficient, and the results of high accuracy, to the technology that facilitates the access to information and facilitate the decision-making. Progress from the science and practice of metrology that has not been accommodated in the existing law. In addition to adjusting laws with technology, the government should also pay attention to the provision of human resources to operate technology in the field of metrology.

## 1 INTRODUCTION

In everyday life, human beings cannot be separated from measuring activities, ranging from performing simple measurements to measurements that require high technology (BPHN, 2013). Measurement activities have become part of everyday life that we often do not realize, for example:

- The speedometer on the car used when monitoring the speed of the vehicle, to ensure the safety of the trip thereby reducing the casualty of traffic accidents.
- At the time of undergoing a medical examination to make sure we stay healthy, then used health measuring device.
- When using the time to use appropriate and satellite positioning system to determine location.
- When consuming electricity, gas, and water, it will be billed by measurement.
- When buying meat, fish, fruit, and vegetables, it will be paid based on the weight of the commodity purchased.

- At the time of refuelling the vehicles then use unit volume (OIML, 2018)

All of the above activity examples can be measured, and measurement activities are called metrology.

Not many understand metrology in depth. Article 1 point a Law No. 2 of 1981 regarding Legal Metrology defined that metrology is a science of measuring widely. According to the International Vocabulary of Basic and General Terms in Metrology (VIM), metrology is an activity that encompasses all the activities necessary to make the correct measurements, traceable and acknowledged in national, regional and international levels, in such a way as to create mutual trust in between the parties conducting or having an interest in the measurement. This mutual trust then created social cohesion in society and facilitated transactions in the global marketplace.

The diversity of human needs for measurement, resulting in metrology developed into three categories such as industrial metrology, legal metrology, and scientific metrology. This international classification was introduced in the European community through the European

Collaboration in Measurement Standards (EUROMET, then EURAMET). Industrial Metrology is intended to provide certainty of the accuracy of the equipment used in the planning, production process and the process of testing the characteristics of industrial products in such a way that the quality of its products can be accepted internationally. Legal metrology is concerned with measurements that impact economic, health, and safety transactions. Scientific metrology, related to the regulation and development of its measurement and maintenance standards (highest level) (Howarth and Redgrave, 2008). The categorization of metrological activities introduced by EURAMET is then internationally accepted in the grouping of metrology applications (BPHN, 2016)

Metrology includes three main things (Howarth and Redgrave, 2008):

- Determination of the definition of internationally accepted measure units; such as meters.
- The manifestation of units of measure based on scientific methods; such as the embodiment of the meter values using a laser beam.
- Determining the traceability chain by determining and recording the value and accuracy of measurement and disseminating that knowledge; e.g., the relationship (ratio) between the measuring value of a screw micrometer in the workshop and the standard length in the standard laboratory length.

The accuracy and consistency of measurements can be guaranteed if there are arrangements by the state or government. The standard is intended to create a healthy and fair market, especially for consumers (Johnston, 2009). The legal protection of Metrological activity in Indonesia is governed by Law No. 2 of 1981 regarding Legal Metrology (UURL) which outlines the units of measurement, unit standard, testing and calibration of Measuring, Dosing, Weighing Devices and their outfits (UTTP) and Goods In Wrapped Condition (BDKT) along with prohibited conduct related to circulation and use of Measuring Instruments and Measurement Units that are not in accordance with BDKT provisions and circulation that are not in accordance with the provisions.

UURL is aimed at ensuring verifiable measurement and legal certainty of measurement in activities related to transaction justice, public health, environmental protection, and safety. Both of these

activities have to be recognized internationally and truthfully.

Various developments related to measuring technology, unit size definition, BDKT testing system, international agreement, governance system, the application of calibration service, community needs and the amount of criminal sanction and penalty, a new law which regulates a comprehensive system national metrology is integrated in accordance with the development and futuristic so as to be able to answer the needs of the measurement for the future.

The scope of UURL arrangement substantially focuses on legal metrology from the trade side. While the protection of the public interest associated with measurement is not only a fundamental requirement for governments, traders, entrepreneurs, consumers and trade practices alone, but legal metrology covers all aspects of public interest related to measurement such as health, safety, environment and monitoring and control natural resources.

Based on the above conditions, national legislation should provide recognition of international legal instruments, so that the certainty of measurement can be guaranteed not only nationally but also internationally. Progress from the science and Metrology practice which is not accommodated in the existing law. UURL has not yet accommodated all the overall metrology system arrangements that include scientific metrology, industrial metrology, and legal metrology. The urgent need for legislation that addresses the problems and challenges that develop at the national, regional and international levels, it is time to create a more comprehensive Metrology Act.

The problem of this research is formulating into question: how is the development of science and technology as urgency in the improvement of regulations in the field of metrology?

## 2 RESEARCH METHODOLOGY

This research is legal research. The approach method used is normative juridical. Data obtained through the literature. As an initial step, an analysis of the various laws and regulations of metrology was conducted. Furthermore, data related to the definition, principles, and principles of metrology were collected from literature in the form of books and journals. Besides, some data is also obtained through the internet and dictionaries. The total data collected was then analyzed qualitatively, and

presented systematically to obtain the answers to the problems in this study.

### 3 RESULT AND DISCUSSION

The role of the state in metrological activities is to provide the necessary tools in ensuring the confidence in the measurement results (OIML, 2012). It requires the government to implement the necessary measures to promote metrology, develop adequate metrological infrastructure, support metrology research to protect communities and business actors against fraud related to measurement. This activity should be regulated in a comprehensive and coherent policy so that metrological legislation is required.

The modern metrology element has grown to such an extent that it is not limited to traditional legal metrology activities. The importance of metrology activities for socio-economic development requires a comprehensive and coherent metrology policy that takes into account issues related to customers, employers, education, health, safety and security of citizens. In developing a national metrology system, the government should ensure transparency so that every stakeholder with metrology can make informed decisions.

Economic globalization, as well as international cooperation in the field of metrology, is overgrowing. While on the other hand, the community needs a system that is more in line with the standards and systems that develop internationally, a system that provides more assurance of certainty both for the interests of consumers and the interests of the industrial world, especially improving national competitiveness in global competition.

The arrangement of Metrology in Indonesia began to be regulated since 1923, that is with the enactment of the Calibration Ordinance in 1923 which had four times change and last by RI Act. No. Law No. 2, 1981 on Legal Metrology (In the Explanation of Law No. 2 of 1981 explained that with the transition period for 10 years, which in its implementation 15 years, from 1 January 1938 in Indonesia officially applies Metric System Unit in size, dosage, scales and equipment that replaced traditional system units such as to, and Kati. Teron Ordinance has the signing of Presidential Decree No. 54 of 1957 on the appointment of the Parent Committee for Meters and Kilograms and Presidential Decree No. 55 of 1957 on the appointment of meters (X 27) and kilograms (K 46)

as a national standard All these provisions are no longer valid with the enactment of the above UUML. In addition to adopting the International System of SI as the only officially appropriate unit system in Indonesia, Law No. 2 of 1981 regulates the standards, measuring equipment, Calibration and Re-Calibration, goods in a wrapped state, prohibited acts, criminal provisions, surveillance, and investigations. The term National Metrology Institute (LMN) is not known in Law no. 2 of 1981 and all the rules or decisions under it that apply today. However, an interpretation of the existence of LMN can be developed from the substance mandated by UUML.

After the UUML stipulation, it was decided on the formation of the National Standardization Board through Presidential Decree No. 7 of 1989, National Standard Measurement Unit through Government Regulation No. 2 of 1989, the establishment of National Standardization Body to continue the task of the National Standardization Board through Presidential Decree No. 13 of 1997, then the establishment of SNSU Trusteeship, known as the National Standard Committee of Size Units through Presidential Decree no. 79 of 2001, in this Presidential Decree, scientific-technical management of national measurement standards is submitted to the work unit under the Indonesian Institute of Sciences, which is engaged in Metrology namely Center for Metrology-LIPI.

Infrastructure involved in the implementation of metrology in Indonesia has been developed and internationally recognized between LIPI regarding standard size management and research (scientific metrology), National Standardization Body (BSN) in harmonizing standards, and National Accreditation Committee (KAN) in giving recognition in formal to suitability. By recognizing the respective roles of the infrastructure, cooperation and partnerships are necessary to support the implementation of comprehensive metrology activities in turns such as assessment of test laboratories, the preparation of SNI for UTTP products, standard verification, and others.

Technology is the making, usage, and knowledge of tools, machines, techniques, crafts, systems or methods of organization to solve a problem or perform a specific function. It can also refer to the collection of such tools, machinery, and procedures. Technology is a vital component of industrialization and any country which envisions industrialization pay much attention to securing technology appropriate to peculiar needs (Republic of Kenya, 2006).

Technology also plays a direct role in the current structural disinflation because technological innovation has reduced the real cost of certain crucial goods, especially information systems, telecommunications, and transportation. Strong productivity gains-driven in part by technology- also keep inflation low, even when labor markets are very tight.

Globalization even accelerates technological change. Every day there seems to be a new technological innovation created. The pace of change is happening so fast as if everyone were racing each other in buying or updating his or her new devices. Technology is now also a leader in the modern world in creating new jobs, innovations, and networking sites that allow individuals to connect globally (Levin Institute, 2016).

With the advent of programmable hardware components and their integration into measuring instruments, the influence and importance of software, especially in legal metrology, has been remarkably increased. Software validation is an indispensable part of the type examination process in legal metrology. The validation of software concerning the developed requirements of the baseline remains a demanding task due to the absence of straightforwardly defined procedures (Richter, 2006).

The definition of a unit and standard measures are dynamic following the Development of Science and Technology (IPTEK) and the International Agreement. Science and technology are continually evolving and proportional to their application in the world of measurement, in this case, the world of metrology, since almost every discipline must involve calculation, measurement, calibration, certification, and so on.

UUML was born at the time of unknown information system as reliable as it is today. Starting from the measurement technology is more effective, efficient, and the results of high accuracy, to the technology that facilitates the access to information and facilitate the decision-making.

Another significant development is nanotechnology. Nanotechnology is a field of science studies that deal with engineering technology on materials that have a size less than 100 nanometers or billionth of a meter (Allhoff, 2010). This technology can create substances up to one billionth of a meter (nanometer), so the properties and functions of the substance can be changed as desired. In the world of health, nanotechnology can play a role in improving the quality of production and safety (safety

performance), helps solubility, stability, and absorption, multifunctional to detect cancer and to deliver drugs directly to target cells. The use of nanotechnology for community needs products such as in the manufacture of computers, electronic products, cosmetics products, fertilizer industry, nano textile products, nanoceramics, nano coating, nanofilm, nano pharmaceutical world and others including Indonesian herbal (Nurul, 2007).

In Indonesia, the traceability chain for nanotechnology measuring equipment is still not available. Currently, the Nanometrology research group at the LIPI Metrology Research Center is researching the development of traceability of nanotechnology measuring equipment, especially for the nanotechnology-based measuring instrument that is much needed in Indonesia. The use of this technology is highly likely to increase over time. So the government has to think about the legal infrastructure that can accommodate technological advances in the field of nanotechnology.

The rapid advancement of information and communication technology and its widespread utilization potential also opens opportunities for accessing, managing and utilizing large volumes of information quickly and accurately. Utilization of communication and information technology in government process (e-government) will improve efficiency, effectiveness, transparency, and accountability of governance (Kemenkumham, 2016).

Along with technology is always needed human resources capable of running to operate the technology. UUML regulates the rightful employee along with authority to conduct re-calibration, refrain and damage the measuring instruments that do not meet the requirements. Metrological activity is not only done by measurement manpower but also involves laboratory institutions, standard managers, supervisors, Civil Servants Investigator (PPNS), researchers, and so forth.

Resources owned by local governments in organizing metrology activities are quite limited. A survey conducted by the Japan International Cooperation Agency (JICA) in 2006 shows that there is a change of function in the region as a result of regional autonomy, resource constraints, and equipment limitations.

Based on the result of study of legal metrology system by Domestic Trade Research and Development Center Puslitbang Perdagangan Dalam Negeri, Trade Research and Development Agency of Trade Ministry in 2007 found that one of the obstacles of local government is the resources and

institutional of regional metrology unit experiencing inequality between Java region (for example DKI Jakarta, East Java, West Java) and outside Java. Both are human resources and technical infrastructure support where the condition of legal metrology unit outside Java island is quite alarming. Comparison of performance results for each metrology unit has an average of 17.88 functional HR people to serve 9.13 districts/cities; 103.6 Subdistricts; and 1,168.94 villages with 4,381,186 residents (Kemenkumham, 2016).

There is no explicit regulation related to professional standards, competency standards, and professional ethics and has not set clearly about education and training metrology. At the level of the implementation of national tera and re-tera service has not been optimal due to the limited number of human resources, and the difficulty in getting the right personnel formation in various regions. For the improvement of the new regulation, the standard conditions are clear arrangements on the types of HR Kemetrolagian, clarity of standard setting: profession, competence, operational procedures and professional ethics, as well as the precise arrangement of Kemetrolagian Education and Training, and reactivation of Metrology Academy. Metrology will continue to grow and go hand in hand with increasingly advanced technology and science. It takes continuous research to keep metrology relevant and useful for human life. Likewise, the law must go hand in hand with these technological developments. If the law lags behind, then there will be chaos, because the law always aims to achieve order.

#### 4 CONCLUSION

UUML is aimed at ensuring verifiable measurement and legal certainty of measurement in activities related to transaction justice, public health, environmental protection, and safety. UUML has not yet accommodated all the overall metrology system arrangements that include scientific metrology, industrial metrology, and legal metrology. Even with the advancement of science and technology, the practice of metrology is no longer contained in the existing law. The urgent need for legislation that addresses the problems and challenges that develop at the national, regional and international levels, it is time to create a more comprehensive Metrology Act. Also, the government must also think about the required operator power, which is capable of running human resources to operate the technology.

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