NIMT's Eighteen Years of Experience and Our Way Forward

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  - Some lessons learned
- Mode of Operation for Future challenges
- National Metrology System Development Master Plan III (2017 – 2021)

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Foundation & Present status

Metrology in Thailand

Scientific Metrology

National Metrology System Development Act B.E. 2540 (1997)

National Institute of Metrology (Thailand)
Ministry of Science and Technology

Legal Metrology

Weights and Measures Act B.E. 2466 (1923)

Central Bureau of Weights and Measures
Ministry of Commerce

National Metrology System Development Act B.E. 2540 (1997)

Autonomous institution under Ministry of Science and Technology

Designated **national highest authority** in scientific metrology

Labs & Offices

Two (2) campuses:	Organisation:
- One in Pathum thani	- 7 Metrology Departments
- The other in Bangkok	- 2 Administrative Departments
	- 1 MIS Centre
Laboratories with strictly controlled temperature and humidity	Easy maintenance with minimum interruption
Good vibration control	Energy conservation
Good working environment	24 hour operation

Staff & Budget

- Staff ~ 210
  - ~ Metrologist: 140
    (Bachelor: 27, Master: 65, PhD: 45, Others: 3)
  - ~ Supporting staff: 70
    (Bachelor: 40, Master: 21, PhD: 3, Others: 6)
- Budget:
  - ~ 8.5 million USD from government
  - ~ 1.5 million USD from services
  - ~ 60 million USD for upgrading national measurement standards and facilities, 2013 - 2017

To be completed in Nov 2017

- Construction ~ 24 Million USD
- Equipment ~ 16 Million USD
- Area 12,000 m^2
- 7 floors, 5 groups of laboratories

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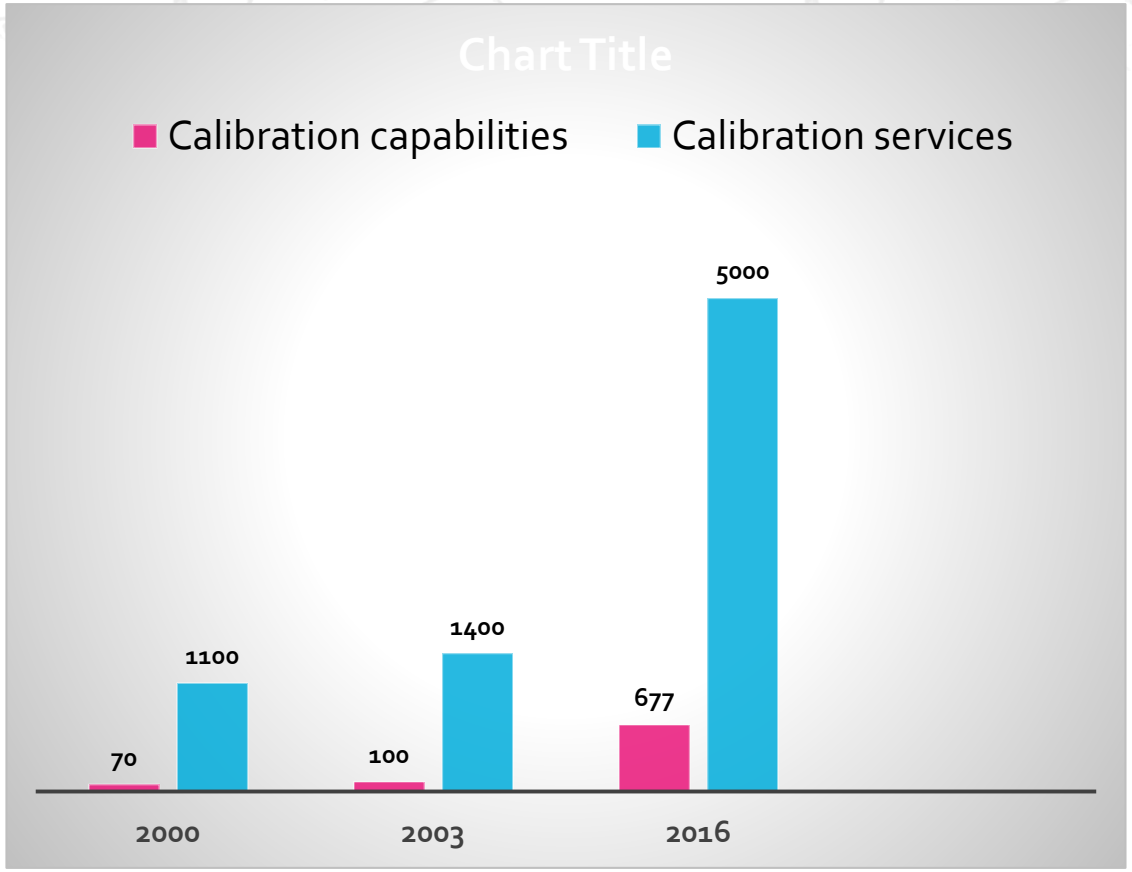
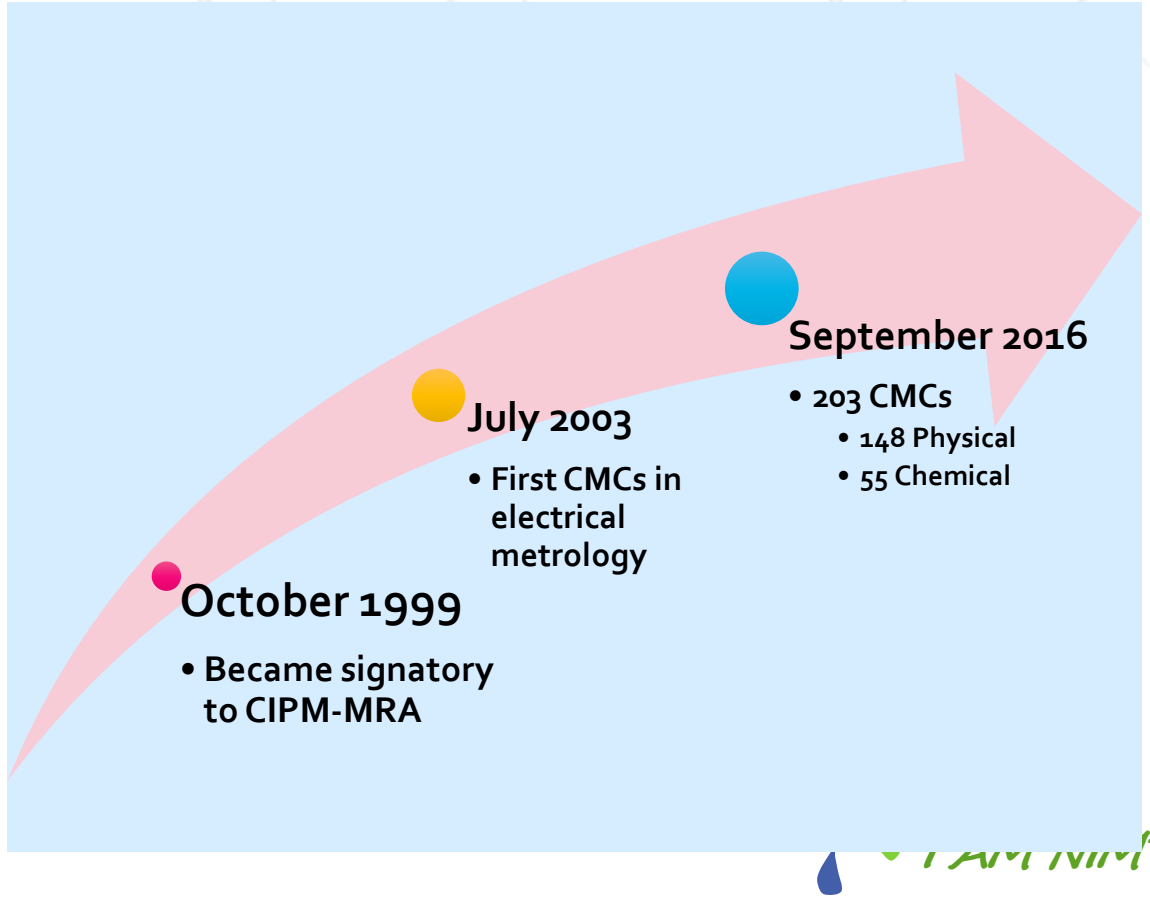
Calibration capabilities & services



CIPM-MRA and CMs



Some lessons learnt – Influential factors

- Good understanding and strong support from decision makers
- Continuity of work
- Starting from practical level
- Demand pull: find partners and work with them
- Friends: support and guidance
- Delivery: keep one's promise

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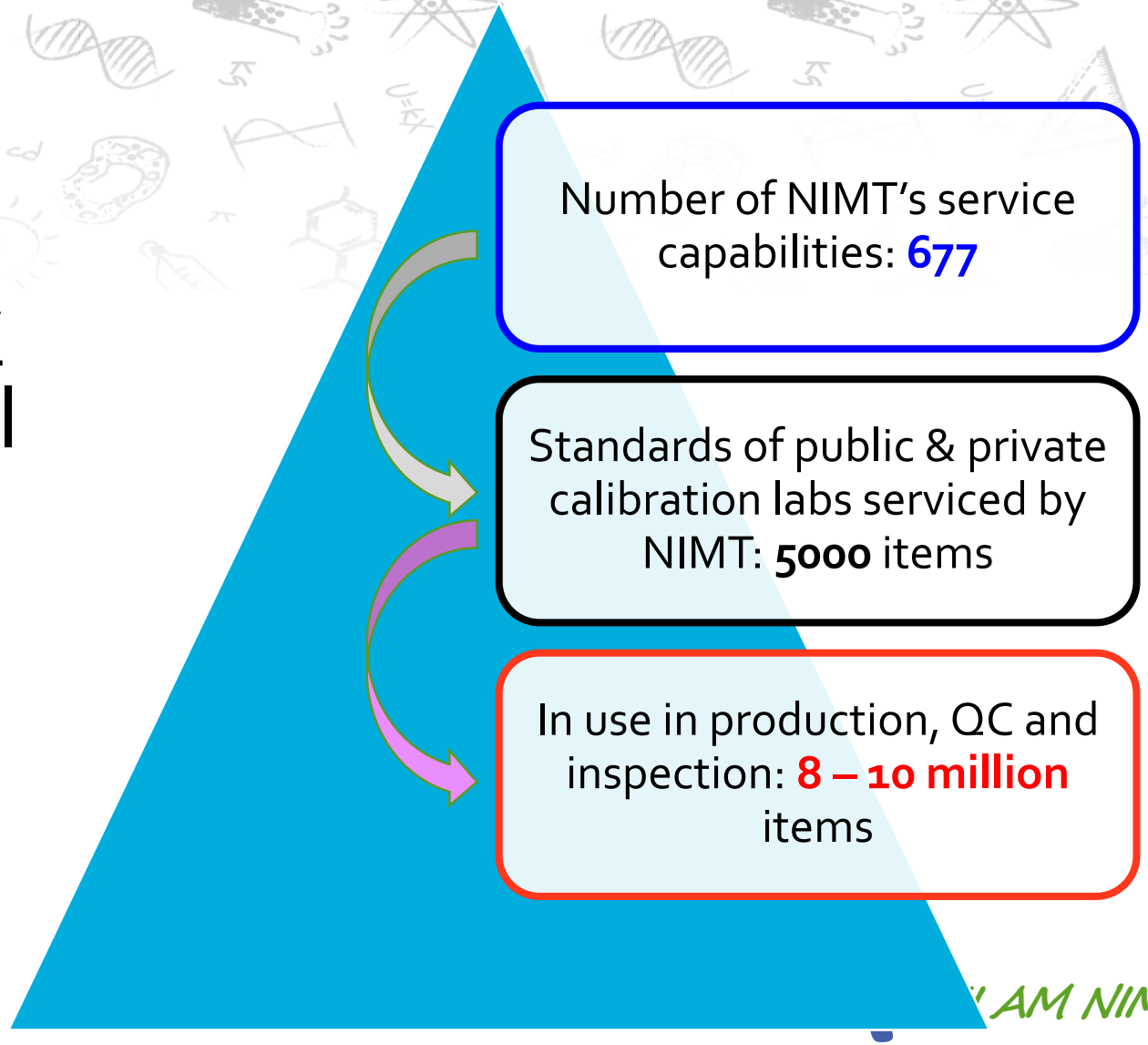
Challenge & Approach

Challenge

Link national metrology development to national economic and social development

Create tangible impacts



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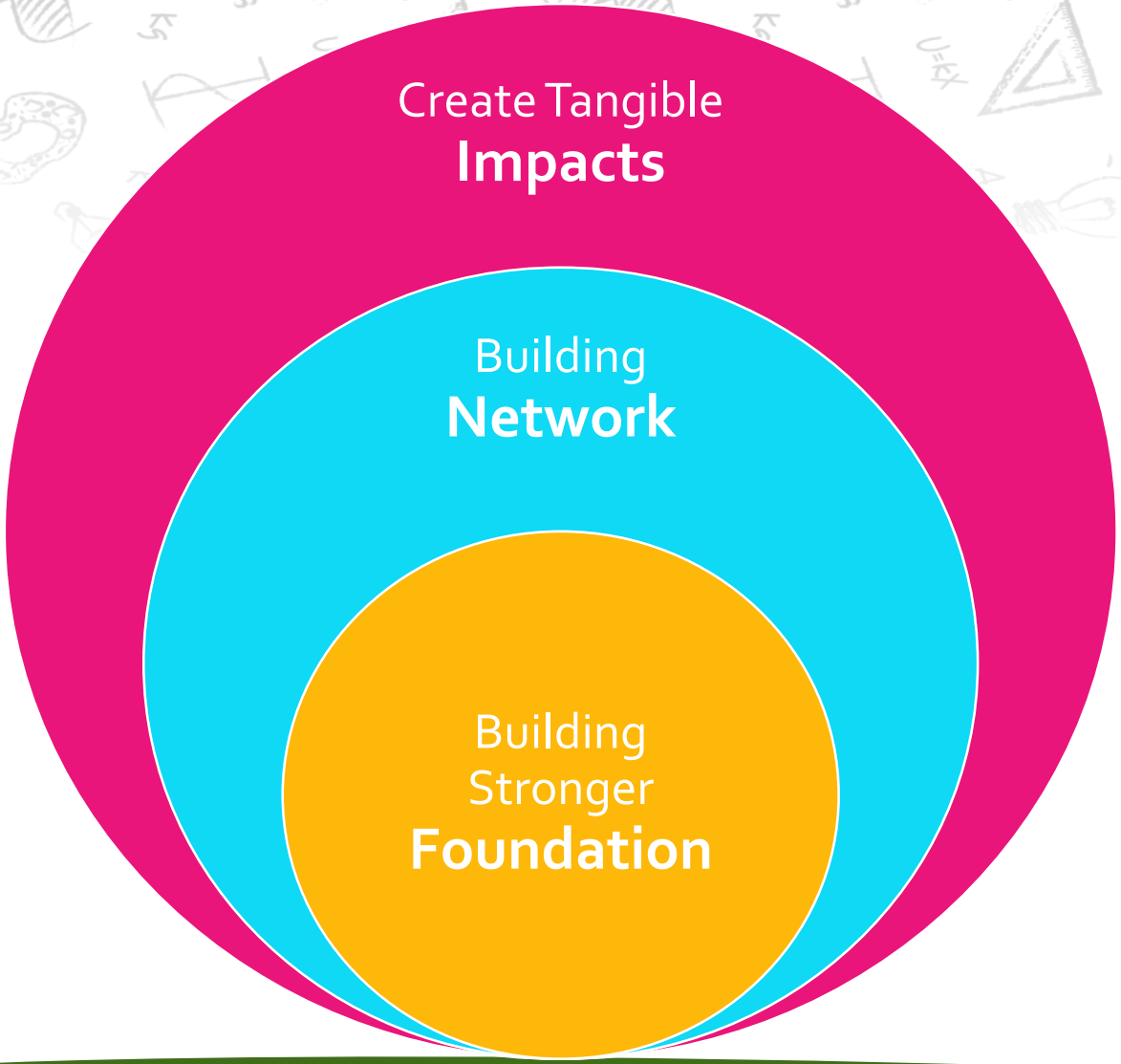
Our Approach



New transfer measurement standards

- SME and Industry
- Quality of Life
- Consumer Protection & Fair Trade

Domestic Network

- Metrology Club
- Chemical Metrology Laboratory Network

Regional Network

- ASEAN Experts Group on Metrology
- APMP, APMP-DEC

International Network

- Bilateral collaboration e.g. NMIJ, NICT, PTB, NIM, KRISS
- Participation in international forum: BIPM, IMEKO

Chemical Metrology & Biometry		Physical Metrology		International recognition	
New lab building	New equipment	Upgrade measurement standards	New quantities, ranges & techniques	Participate in Key Comparisons	Research collaborations

Building stronger foundation

Chemical Metrology & Biometry

- New lab building
- New equipment

Physical Metrology

- Upgrade measurement standards
- New quantities, ranges & techniques

International recognition

- Participate Key Comparisons
- Research collaborations

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Building network

Domestic Network

- Metrology Clubs (12)
- Chemical Metrology Laboratory Network

Regional Network

- ASEAN Experts Group on Metrology
- APMP, APMP-DEC

International Network

- Bilateral collaboration e.g. NMIJ, NICT, PTB, NIM, KRISS, etc.
- Participation in international forum: BIPM, IMEKO, etc.

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Creating tangible impacts

New transfer measurement standards

- SME and Industry
- Quality of Life
- Consumer Protection & Fair Trade

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Accurate temperature measurement

- Frozen food industry
- Company profile:
  - Company 1: Ice-cream factory
  - Company 2: Fresh, Frozen and Dried Vegetable and Fruit Exporter

- Company 1 can save energy about 21%
- Company 2 can save energy about 27%
  (or 10% of the production cost)

Standard Torque Transducer & Standard Torque Transfer Wrench

- Can be used as transfer measurement standard to calibrate torque screw and torque wrench in industry

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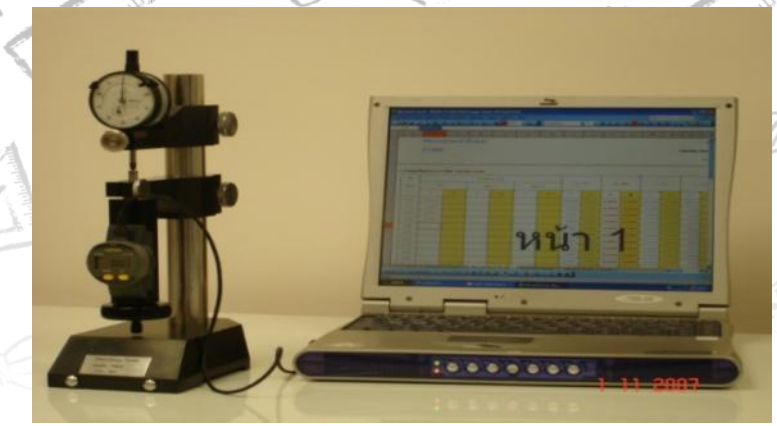
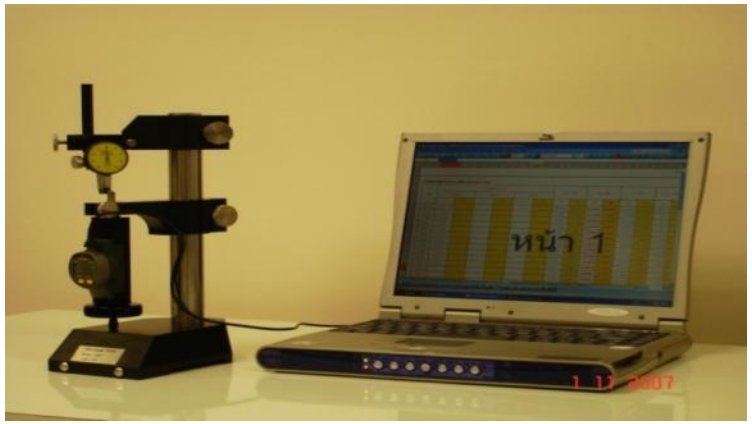
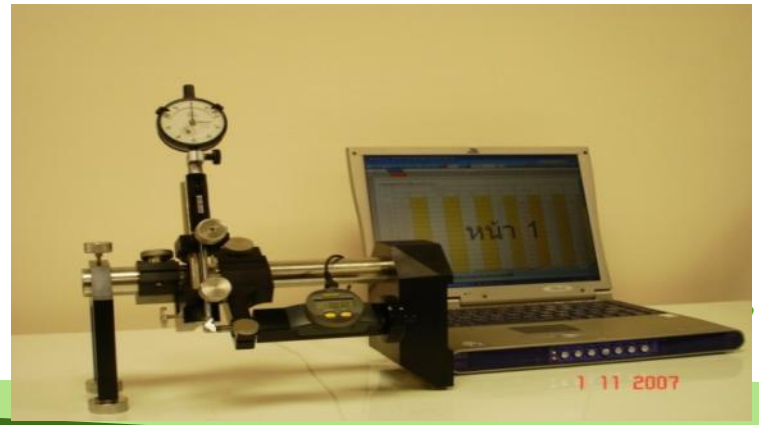
Dial Gauge Tester

- Calibration of dial gauge, dial test indicator and bore gauge
- Range: 0-50 mm
- Resolution: 0.001 mm
- Accuracy: 0.003 mm
- Low cost measuring instrument
- Automatic data recording and analysis, shorten operation time up to 30%
- Calibration laboratories
- QA/QC in industries, especially automotive industry

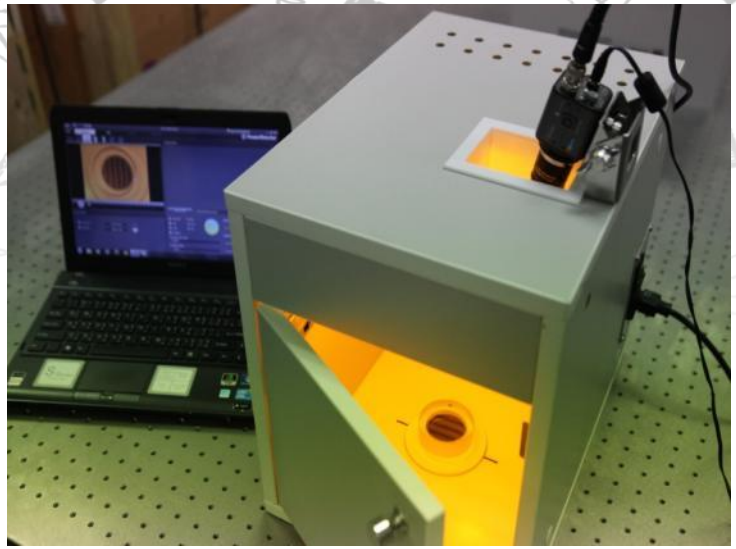






Flatness Tester

- Flatness measurement of flat surface and calibration of optical flat and optical parallel
- Range: 20 nm – 1 mm
- Resolution: 0.01 nm
- Diameter: 30 mm – 60 mm
- Accuracy: 20 nm (λ/5)
- Low cost measuring instrument
- Automatic data recording and analysis, no human error, not require operation skill
- Calibration laboratories
- QA/QC in industries, especially automotive industry and electronic industry



Certified Reference Material for Determination of Cholesterol in Serum

- TRM brand cholesterol in frozen human serum by exact-matching isotope dilution mass spectrometry
- Same quality as imported CRM but with much lower price!

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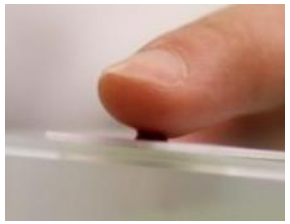
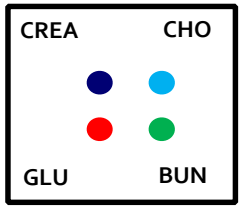
Point-of-Care Medical Diagnostic

- Low Cost $0.10
- Portable
- Accurate & Sensitive
- Suitable for Remote Locations
- Glucose, Cholesterol, Creatine & BUN

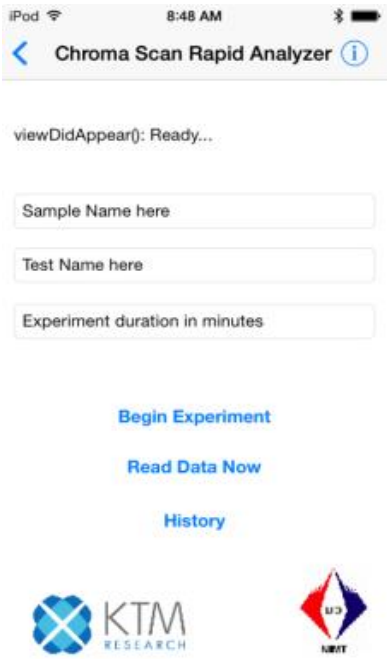
Prick finger

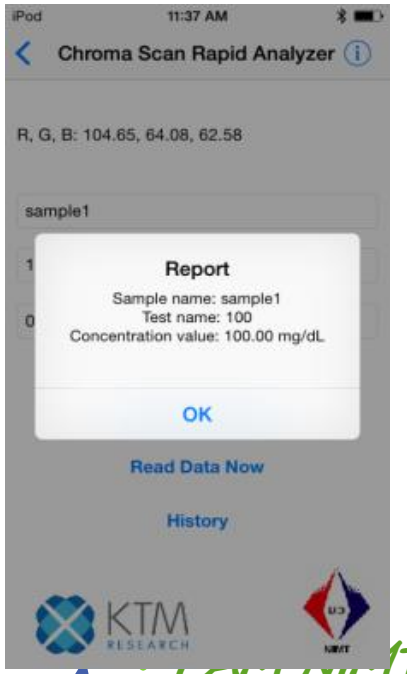


Apply sample



Colour develops

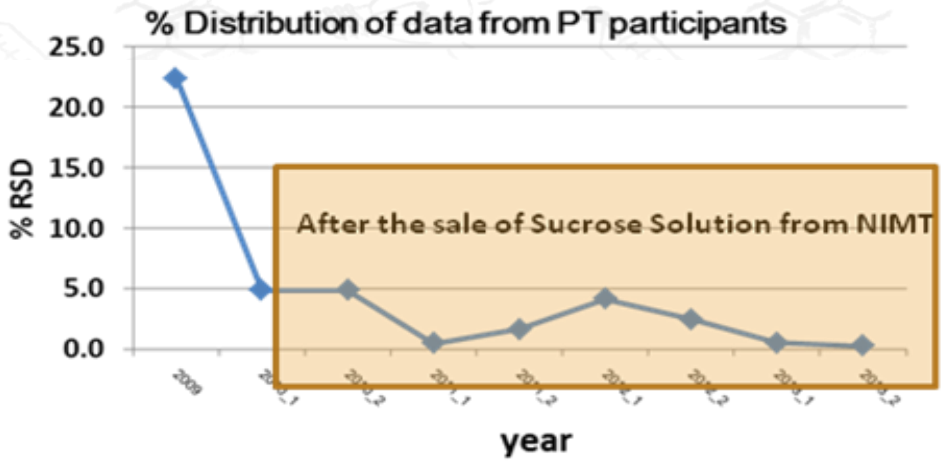




Sucrose solution for refractometer calibration

- For sugarcane trade
- Bring confidence and fairness to farmer and sugar factory

Proficiency testing scheme for determination of Brix



Variation of data from participants improved from 20 to 1 %RSD

1. One of the biggest sugar exporter, about 7 million tons, worth 30,000 million baht
2. Internal consumption 3 metric tons, worth approximately 20,000 million baht
3. Involved more than 1,000,000 farmers

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National Metrology System Development Master Plan III (2017 – 2021)

APPROVED IN PRINCIPLE BY THE NATIONAL METROLOGY COMMITTEE

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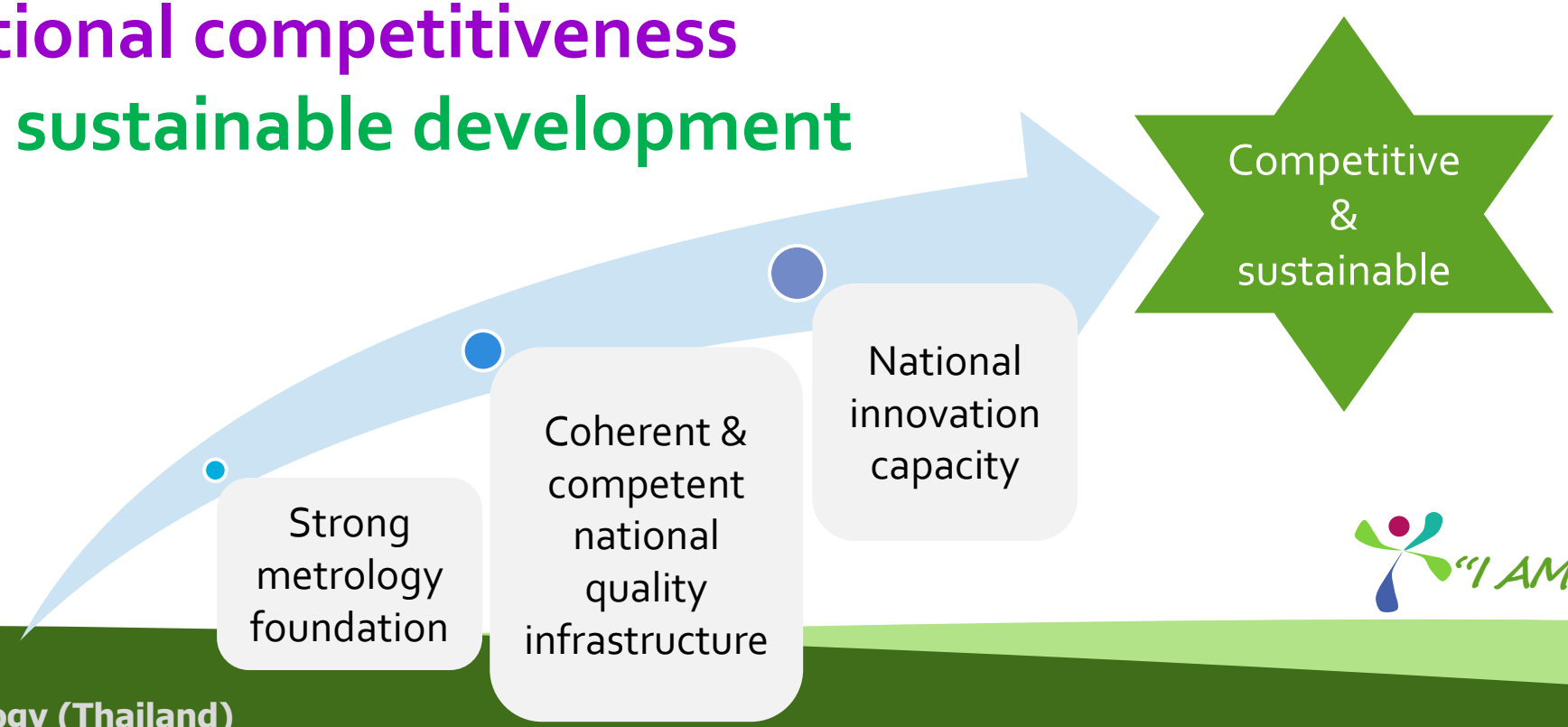
Vision

Strong metrology foundation for a
coherent and competent national quality infrastructure
to enhance **national innovative capacity** in order
to raise **national competitiveness**
and enable **sustainable development**



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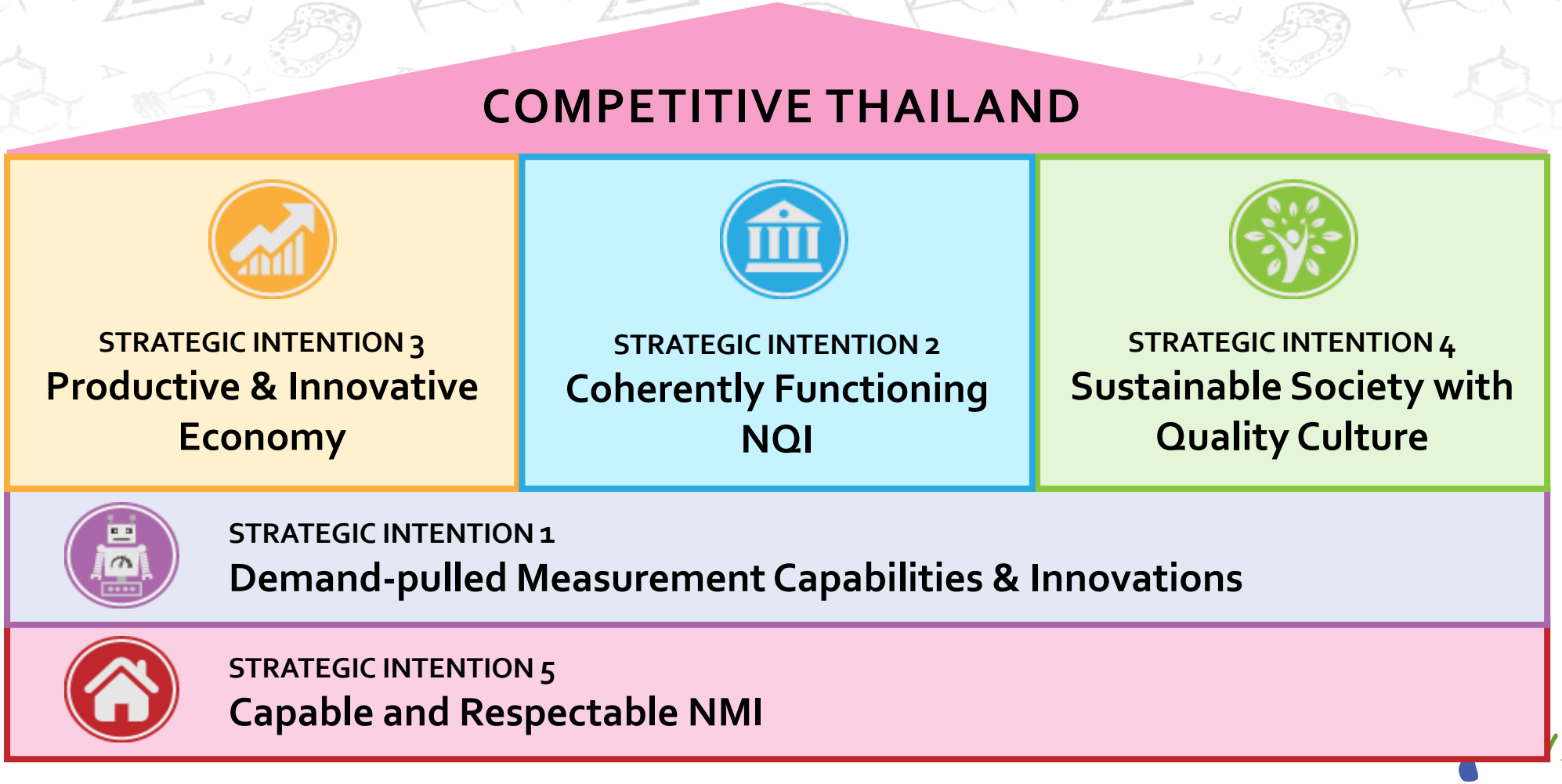
Structure of Strategic Intentions



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Areas & impacts focused in the Master Plan

Social

- ✓ Improved public health services
- ✓ Enhanced road safety
- ✓ Enhanced consumer protection
- ✓ Better managed energy & environment

Environment

- ✓ Effective pollution control
- ✓ Increase Green energy
- ✓ Improved natural Disaster management
- ✓ Carbon footprints reduction

Economy

- ✓ Efficient manufacturing process
- ✓ Efficient energy consumption for manufacturers
- ✓ Increase productivity for industry
- ✓ Cost-saving from importing foreign know-how

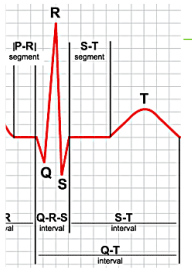
Quality of Life: Good Health Great Life

Preparation of Guidelines for Testing or Verification of:

Clinical Electronic Thermometer

Radiant Warmer

High-Frequency Surgical Devices



EKG

Microwave Therapy Devices

Short-Wave Therapy Devices

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Quality of Life: Safe Life, Safe Asset

Metrology for Road Lighting and Traffic Signs

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Consumer protection & Fair trade

Calibration of Polarimeter Used In Sugar Industry

Method for Determination of Amylose/Amylopectin in Rice

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Quality of Life: Clean Air

Standardization of Mix-Gas RM to Be Used for Regulating Industrial Air Pollution.

Metrology for Air Quality

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Sustainability: Green and Efficient Energy

Metrology for Solar Cell

Metrology for Bio-fuel

Metrology for Supporting Upgrade of National Transmission Lines to 500 kV

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Innovative Economy: Prototypes, Innovation and Skill Development

PROTOTYPE & INNOVATION

- Motion error measuring kit
- Sphericity measuring machine
- Tuneable laser
- Steel ball interferometer
- Step gauge interferometer
- Laser Interferometer system
- Laser interferometer for linear scale
- high stability frequency module
- diving bell manometer
- Heat flux measurement

SKILL DEVELOPMENT & PRODUCTIVITY

- AEC metrological skill development centre project

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Programmes to deploy the strategies

Economic development

Programme 1:
Supporting **Government's Infrastructure Development** Projects

Programme 2:
Raising **competitiveness of targeted industries & SMEs**

Programme 3:
Metrology for **productivity improvement**: knowledge & technology transfers

Social development

Programme 4:
Building **quality society and quality culture**

Programme 5:
Metrology for **energy & environment management** and sustainable development

S&T development

Programme 6:
Metrology for **national STI infrastructure**

Programme 7:
Smart and internationally engaged **NIMT**

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Thank you for your kind attention!

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