Asia-Pacific
Economic Cooperation

11th Conference on Standards and Conformance – Project on Standards Innovation: Conference Report

18 – 19 August 2016
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Sub-Committee on Standards and Conformance

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Executive Summary

The CTI 20 2015T – 11th Conference on Standards and Conformance – Project on Standards Innovation was held on 18 and 19 August 2016 in Lima, Peru. Attendance at the conference included speakers, experts, officials, representatives from APEC member economies, such as Australia; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; Republic of Korea; Malaysia; Mexico; Papua New Guinea; Peru; the Philippines; Russia; Singapore; Chinese Taipei; Thailand; the United States; Viet Nam, APEC Specialist Regional Bodies, international organization like IEC[1] and non-APEC organization like PTB[2].

It was a 2-day conference held in the confines of SOM 3 in Peru. The first day was for exchanging information among APEC economies about the initiatives, strategies and experiences of members. Economies with successful experiences were invited to share their experiences as speakers, and this was identified in a survey. In the second day case studies were included from different economies to prove the importance of standardization, accreditation and metrology in innovation.

With these experiences, participants from 19 economies increased their capacity building and knowledge on standards and its role as an innovation driver, including conformity assessment and metrology as a tool to support technological change and to promote trade facilitation.

Also, a post conference survey was conducted in order to know if the conference experiences where clear enough in order to promote their implementation, their commitment and intention to implement within their own economy any initiative learnt in the conference and their intention to disseminate the project outputs to stakeholders within their own economy. As overall result, participants considered mostly useful the conference content and the post action taken from them was to share the information and presentations with stakeholders and colleagues.

[1] IEC: International Electrotechnical Commission.
[2] PTB: Physikalisch-Technische Bundesanstalt (German Metrology Institute).

Introduction

APEC economies have recognized in the "APEC Accord on Innovative Development, Economic Reform and Growth" that the world economy is growing at a moderate pace. To achieve strong, sustainable, balanced and inclusive growth over the longer term, we need to boost demand and identify new sources of growth through innovative development and structural reform (see 2014/AELM/DEC/Anxc). Innovation is a base to build sustainable growth. Thus, standards are an innovation driver, which contributes to trade facilitation among APEC economies.

The APEC Project CTI 20-2015T 11th Conference on Standards and Conformance is focus on the importance of standards as an innovation driver, including conformity assessment and metrology as means to facilitate trade among APEC economies. In order, to know experiences in APEC economies regarding how they have implemented initiatives related to this topic.

The objective of the conference was to share experiences among member economies on standards innovation, including conformity assessment and metrology. In this report, you will find the summary of the presentations, conclusions and recommendations as well as post survey results with the actions taken from participants regarding to the conference's outputs. This conference had the opportunity to have highlighted speakers representing 12 economies, which guaranteed that the participants had the chance to learn what APEC economies are doing in innovation and its relationship with quality infrastructure.

1. Conference Results

The core of the 11th Conference on Standards and Conformance was to share the initiatives and economies' experiences related to how they interact innovation with quality infrastructure in order to learn from each other the best experiences and economies could implement the actions needed to better link innovation to quality infrastructure.

The 11th Conference on Standards and Conformance was held in the Lima Convention Center, from 18 to 19 August 2016. Participants including speakers, experts and officials were from the following 19 APEC economies: Australia; Canada; Chile; China; Hong Kong, China; Indonesia; Japan; Republic of Korea; Malaysia; Mexico; Papua New Guinea; Peru; the Philippines; Russia; Singapore; Chinese Taipei; Thailand; the United States and Viet Nam. The high-level participation of APEC economies shows that it is relevant from APEC

economies to increase the capacity building on standards as innovation driver, including conformity assessment and metrology for trade facilitation.

Also, in the Conference were included as much experiences as possible from speakers representing 12 APEC economies; APEC's Policy Partnership on Science, Technology and Innovation representative; APEC Specialist Regional Bodies; International Organization such as International Electrotechnical Comission and German Metrology Institute (PTB[2]) as non-APEC member.

One of the inputs to select the speakers was a previous survey circulated among diferent APEC fora in order to raise information about economies' project/programs or initiatives, which links standards, conformity assessment and/or metrology to innovation. We received replies from 16 APEC economies belonging to the following APEC fora: SCSC[3], SMEWG[4] and PPSTI[5].

The Conference was divided in 7 sessions, including the opening session. The Agenda is in the Appendix 1, a scheme of the agenda is shown below:

Day 1: 18 August 2016

1. Opening Session: Survey report and relationship between Standards and innovation

Speakers from: Canada and PTB.

2. Session 1: APEC Approach on Innovation related to standards, conformity assessment and metrology

Speakers from: PPSTI[5], APLAC[6] and APMP[7]

3. Session 2: Discussion Policy on Innovation

[3] SCSC: Sub-Committee on Standards and Conformance.
[4] SMEWG: Small and Medium Enterprises Working Group.
[5] PPSTI: APEC's Policy Partnership on Science, Technology and Innovation.
[6] APLAC: Asia Pacific Laboratory Accreditation Cooperation.
[7] APMP: Asia Pacific Metrology Program.

Speakers from: Japan; Mexico; Peru and the United States

Day 2: 19 August 2016

4. Session 3: Accreditation supporting innovation

Speakers from: Malaysia and the Philippines

5. Session 4: Case studies on innovation. Part 1: Energy and Electro technical sector

Speakers from: Indonesia, Peru and IEC

6. Session 5: Case studies on innovation. Part 2: Metrology

Speakers from: Australia and Thailand

7. Session 6: Case studies on innovation – Part 3: Standards

Speakers from: Australia; Republic of Korea and Russia

The following section provides a summary of the presentations given during the conference. In the Appendix 2 is the speakers short biography.

1.1 Opening Session

- **Survey report among APEC Economies: CTI 20 2015T – 11th Conference on Standards and Conformance – Project on Standards Innovation**

Mrs Soraya Lastra, Project Overseer of CTI 20 2015T - 11th Conference on Standards and Conformance, began her presentation by pointing out that the APEC Accord on Innovation establishes clearly that to achieve a strong sustainable, balanced and inclusive growth over the longer term, we need to boost demand and identify new sources of growth through innovative development and structural reforms. Standards, conformity assessment and metrology helps to contribute trade facilitation among APEC economies, and that is the

reason for the survey. One of the APEC priorities in this year is investing in human capital development, this priority establish that education increase knowledge, and knowledge to produce innovation, and in that way to contribute to economic growth, which will allow more people in APEC economies to get even more education, creating a cycle that will be proved in the project.

She continued her presentation mentioning that the project identified as an objective to achieve a clear identification of the relationship between strong standards and innovation in APEC economies.

The survey was a tool that helped us to identify the experiences in APEC economies that can be explained in the conference.

The survey objectives were the following:

- To know the economies' concept regarding the relationship between standards, conformity assessment, metrology and innovation.

- To gather information related to programs, incentives and legal framework on innovation and if it considers standards, conformity assessment and metrology.

- To identify initiatives implemented in APEC economies.

The survey had three parts: The contact details section. The general concepts section and the economy section.

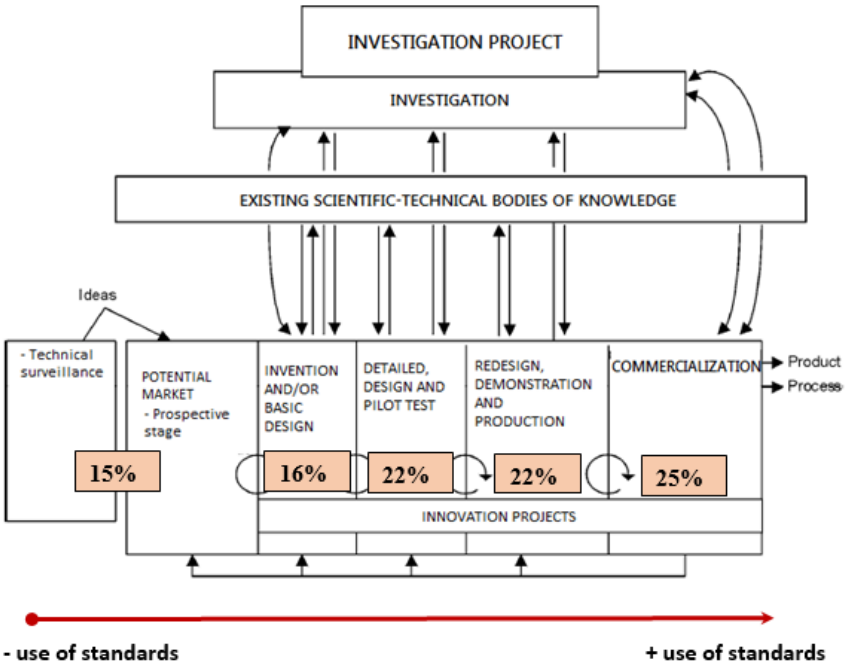
The results of the survey showed:

- Regarding the survey respondents, 87% were public institutions.
- Among the organizations or institutions: 32% corresponded to NSB (National Standards Bodies).
- A clear tendency in the perspective of standards as beneficial to innovation, improvement of the process of R&D&I[8] and as a motivator to drive public policy, regulations or political agendas into the innovation path. 22% pointed out that

[8] R&D&I: Reserarch & Development and Innovation

standards promote innovation, 22% that standards improve the process of Research & Development and Innovation at any stage, 20% that standards give technical support to innovation process at any stage, 20% that standards seek to establish, drive or motivate public policy, regulations, or social/political agendas on innovation.

- Regarding the stages at which standards participate in the innovation process, the following graph showed the values in percentage for each stage.



The graph shows when we are evolving at different stages of innovation project, the use of standards come increase. Therefore, at the beginning stages we can also see the participation of 15%, but when we are advancing in an innovation project, there is increasing also the need of standards. This makes sense, because in the beginning when we are doing an innovation project maybe the standard can be improved, maybe this could be a new standard or maybe it has another complementing standard. But, when we develop a product, and we would like to be commercialized in a huge scale, it is important for the consumer and for the international trade to have a background of standard.

- In the question regarding whether economies have any programs or incentives which promote innovation, 94% answered that yes.

- Regarding the whether programs or incentives directly incorporate or promote the application of standars, metrology and conformity assessment in them, 73% answered that yes.

- 63 % of the economies reported to have a legal framework about innovation, but only 44 % involve into their legal framework the use of standards, metrology and conformity assessment.

- In the question regarding whether the economies had ever developed or participated in any program/project or initiative which links (involves) standards, conformity assessment and/or metrology with (to) innovation, 75% answered that yes.

- Economies that gave a brief description of their initiatives were: Australia; Hong Kong, China; Indonesia; Japan; Malaysia; Mexico; Peru; the Philippines; Russia; Singapore; Thailand and the United States.

- Regarding whether the project, program or initiative have any coordination with the National Standards Body, Accreditation Board, National Metrology Institute and/or Conformity Assessment Body. This was important because it showed how an initiative fostered by an organization could involve more actors that belong to quality infrastructure. We can see that the highest number of involvement came from the National Standard Body, followed up by the National Metrology Institute, the Conformity Assessment Bodies and the Accreditation Boards. It is important to say that 3 economies reported to have a medium or high level of commitment between the 4 of them, and 2 economies reported to have a high level of commitment among 3 of them. This is important to consider if we want an initiative to be replicable and sustainable.

- All the economies that declared an initiative, responded that their initiatives are replicable and sustainable.

- 92% of the economies believed that their initiatives are relevant for APEC fora.

- 100% of the economies considered that standards, conformity assessment and metrology positively impact innovation.

The main conclusions and recommendations of the survey were:

- From 16 economies, which participate in this survey, 94% agrees that commercialization stage is where standards play a better role in an innovation project.
- 69 % of the economies, which participate in this survey (eleven from sixteen economies), consider the application of standards, metrology and conformity assessment into their programs or incentives, which promote innovation.
- To the economies, it seems to be easier to incorporate a quality infrastructure component in initiatives and programs than in legal framework.
- Regarding projects, programs or initiatives that links standards, conformity assessment and/or metrology with innovation, 75 % of the economies reported to have developed or participated.
- The following eleven economies reported that their project/programs or initiatives which links standards, conformity assessment and/or metrology to innovation are replicable, sustainable and relevant for APEC economies: Australia; Hong Kong, China; Indonesia; Japan; Malaysia; Mexico; Peru; the Philippines; Russia; Thailand and the United States.

- **Standards as Innovation Drivers**

The second presentation was given by Dr Alexis Valqui, Head of the working group "Technical Cooperation in Latin America and the Caribbean" of Physikalisch – Technische Bundesanstalt (PTB). His material presentation was prepared jointly with Dr Axel Mangelsdorf, who brought the researcher perspective.

The first part of his presentation was regarding the interest that we should have on standardization and its relation to innovation. Globalization is part of it. It brings an increased importance of standards in every day and commercial life.

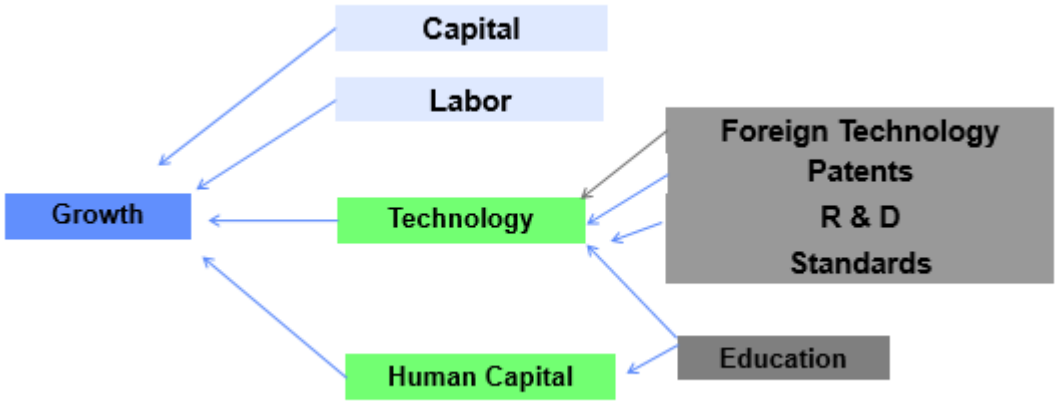
Also, the global economy trends: Global markets, global production and global competition. On the other hand, complex technologies, every expanding digital economy, which brings innovation pressure. Lastly, increased pressure for governments to create policies for innovation (a system for knowledge creation and diffusion) and here standards play a very important role.

A table with the economic characteristic of standards was shared to have a better understanding:

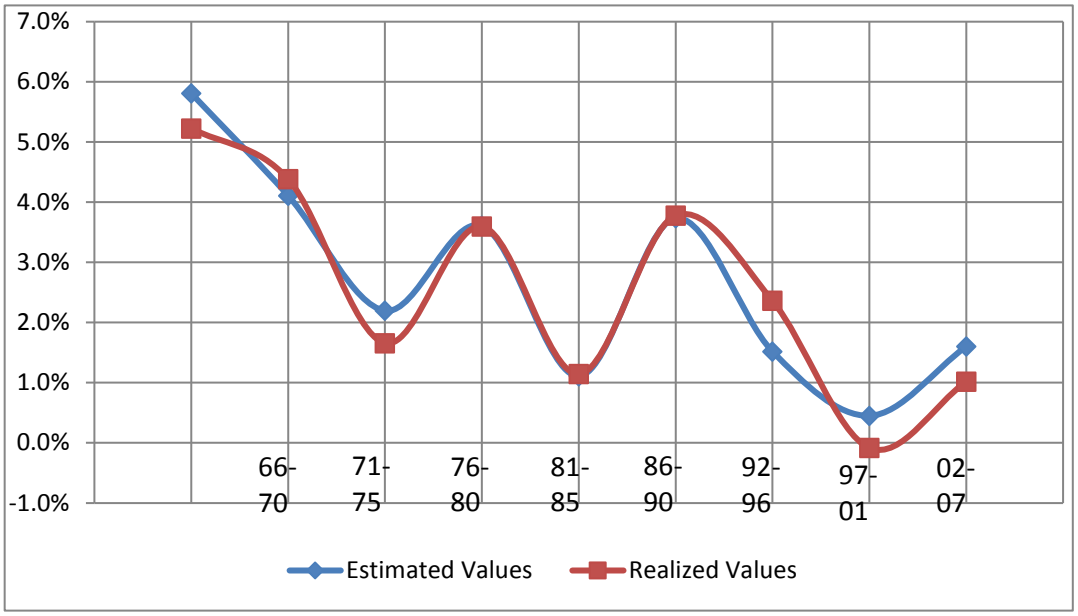
	Positive Effects	**Negative Effects**
Compatibility / Interface / Interoperability	• Positive **network externalities** (e. g. telecommunication) • Avoiding **lock-ins** (from old to new releases of software) • Increased **variety** of systems or products (e.g. IT systems) and more efficiency in the supply chains	• **Monopoly** power by proprietary standards (e. g. Microsoft)
Minimum Quality/ Safety	• Correction for **adverse selection** (no racing to the bottom in quality) • Reduced **transaction costs** (e. g. lower contract costs) • Correction for **negative externalities** (e. g. environmental standards)	• **Raising rival's costs** (too ambitious standards discriminate suppliers of lower quality)
Variety Reduction	• **Economies of scale** due to mass production of one specification (also in earlier stages of the supply chain) • Building focus and **critical mass** in emerging industries and technologies	• **Reduced choice** • Market **concentration** to suppliers of mass products
Information	• Facilitates **trade** due to higher transparency • Reduced **transaction costs** since specifications are defined	• **Raising rival's costs** by too ambitious standards

- Regarding, the table above was emphasized that if Standardization does not follow good practices, the negative effects will make stronger.
- The traditional view of standards was to reduce product variety and therefore hinder innovation, and the high risk of choosing the wrong technology.
- The modern view is quite different: Standards act as "catalysts" for innovation and also promote innovation by reducing time to market inventions by promoting trust in innovative products (health and safety requirements), standards contribute to the promotion of the diffusion of innovative products. Additionally, the fact that compatibility standards are the basis for innovation in network industries, and the creation of new platform standards as basis for innovation, such as the MP3 format.
- In the macroeconomic level the following has been evidenced in the study "The role of standards for economic growth":
    - Idea: standards help to diffuse the technological knowledge.
    - Standards codify technological knowledge, which can be accessed by everyone.
    - The larger the pool of public available knowledge in form of standards the larger the diffusion of knowledge in the economy.
    - The larger the diffusion of knowledge in the economy the more likely the adoption of new products.
    - Diffusion equals spread of a new product or process throughout society or markets.
    - Adoption equals the decision to use an innovation.

- In the growth theory, there are different factors that define your growth and the technology part besides capital and labor, it can be promoted, not only by partners and researchers in development but also by standards. The following graph was shown to explain this better:



- The study mentioned revealed the following results:
  - Standards have a positive impact on Gross Domestic Product (GDP) Growth.
  - Increases in the quantity of standards are associated with increases in economic output.
  - Standards are at least as relevant for economic growth as patents and licensing expenditures.
  - Standards contribute to about 1/3 of GDP growth.



- In the microecomic level the study "Participation in standardization and knowledge seeking" revealed the following:
  - Idea: standardization committees represent ***'knowledge pools'*** that participants want to access.
  - Method: Company survey among German manufacturing companies that participate in German, European and international standardization.
  - Question: What are the motives for participation in standardization committees?
    - Influence regulation.
    - Solve technical problems.
    - Acquire knowledge.
    - Reduce Technical Barriers To Trade, among others.
- The results revealed were shown in the following graph:

- The microecomic evidence showed that Standardization committees are ***'knowledge pool'*** that firms want to access to:

→ Develop rules for open and transparent standardization bodies.
→ Support (small) companies to participate in standardization committees.

- **Driving Innovation through Standardization**

The presentation was given by Mr Stephen Head, Manager of Strategic Policy and Sector Engagement Manager of Standards Council of Canada (SCC). He started by giving some

background information on the SCC. The SCC is a crown corporation, which means arms- length relationship to Canada's federal Government.

The three main topics presented by Mr Stephen Head was Standards and Economic Growth, Standards as an Innovation Driver and Success Stories in the Innovative technologies in standards.

The presentation mentioned that international standardization is important to help entrepreneurs succeed on the global stage. Around the world, there are currently more than 335 000 international technical standards maintained, and year by year the number has been going up. Between 1981 and 2014, growth in the stock of standards accounted for 16% of labour productivity growth and 7,8% of Gross Domestic Product growth.

A recent study on the Economic Value of Standards in Canada looked at the contribution of standards to economic growth and labour productivity.

Standards Drive innovation in the following ways: It is performance based, it facilitates market access and it improves quality and market reputation. The SCC works to support the Government of Canada's efforts on innovation.

They currently count with a new international standards development strategy for Canada.

- Based on public/private cost-sharing arrangements.
- Focuses on innovative Canadian technologies, products, platforms, processes or services.
- Targets organizations aiming to access global markets.
- Provides leadership and financial support in the early stages of the international standards development process.
- Streamlines Process for developing other recognized documents.

The general idea is to develop influential international standards and commercially successful Canadian innovations, they are running a pilot project which is focus on promising Canadian innovative technologies and this can include products, include platforms, processes or services but the idea is to find the benefit from the international standardization process.

To have an idea of the criteria for how select or selected pilot projects are really aiming to invert into standardization earlier and deeper into Canada overall innovation ecosystem, the selection criteria was:

- Potential for sustained economic benefit to Canada.

- Standardization gap/opportunity identified.
- Market entry needs and growth potential.
- One step ahead of competition.
- Resources commitment form industry participants.

Lastly, some success stories were taken into account. First, the Environmental Technology Vertification example. The SCC working with Environment and Climate Change Canada had the objective of developing an international standard. The standard had to be used in multiple sectors, be able to assess environmental performance and increase marketplace acceptance of clean tech deployments.

There was also an example on software engineering, in which Canada initiated standards development work in the area of Very Small Enterprises (VSEs), which required software engineering standards that could be adapted to their size and maturity level. Standard helps VSEs to improve their management and software engineering practices (e.g. project planning) to will increase performance and enhance the firms' reputations.

The Hydro Electric Energy example was also mentioned. Canada spearheaded the 2008 publication of the IEC standard - IEC 62256 Ed. 1.0, which addresses the improved performance and rehabilitation of hydraulic turbines, storage pumps and pump-turbines used for hydro generation. The standard provides guidance in identifying, evaluating and executing rehabilitation and performance improvement projects for hydraulic turbines, storage pumps and pump-turbines of all sizes and of types.

The main conclusion for the presentation was that the effective use of standardization can facilitate economic growth and drive innovation. Additionally, that regulators and industry are increasingly using more international and regional standards. Lastly, standardization is especially important for organizations that have new technologies, services and processes with high growth and export potential.

The final recommendations were to do more research on the link between standardization and economic growth. Secondly, to better facilitate products' time to market. Finally, that it is crucial for economies to ensure that they have the appropriate institutional mechanisms to make effective use of standardization as policy tool and economic driver.

1.2 Session 1: APEC Approach on Innovation related to standards, conformity assessment and metrology

- **Policy Partnership on Science, Technology and Innovation (PPSTI)**

The first presentation of Session 1 was brought by the Policy Partnership on Science, Technology and Innovation (PPSTI), presented by Mr Ma Leju, PPSTI's Chair representative. General information was introduced first.

PPSTI was established in 2012, when the APEC Industrial Science and Technology Working Group included issues of innovation policy development. Now is the primary fora for science, technology and innovation (STI) under the APEC framework.

Its objective is to support the development of science and technology cooperation as well as effective STI policy recommendations through collaboration between government, academia, private sector and other APEC fora. The vision is that APEC will have achieved by 2025 an innovative economic growth through PPSTI's efforts.

In 2016, PPSTI addressed three topics which are: Building science capacity, promoting enabling environment for innovation and enhancing regional science and technology connectivity. One of the highlights in 2016 was the APEC Science Prize for Innovation, Research and Education, with the name ASPIRE. This initiative lead by the United States, to prize recognized young scientist who demonstrated excellence in research.

Cross fora collaboration is one of the main interest highlights of PPSTI in 2016 according to their work plan. PPSTI collaborate with Subcomittee on Standards and Conformance, APEC Business Advisory Council, Human Resource Development Working Group (HRDWG), among others. For the first time in history of PPSTI they had a joint session with another forum such as HRDWG. They talked about the science interpreting, research interpreting, the credit of students, researcher's mobility, among others.

Currently there are different undergoing projects such as the internet of vehicles, the SME Cluster Development, the Smart City Application Forum and the Dialogue on Sustainable Urbanisation, among others.

- **APMP's strategy to foster and support innovation by strengthening measurement capabilities within the Asia Pacific**

Next presentation was given by Dr Victoria Coleman, Asia Pacific Metrology Programme representative. The topics were regarding the role of metrology in fostering innovation and its relevance to Asia Pacific Economies, and also to talk about the Asia Pacific Metrology Programme (APMP).

She started her presentation by saying that the effective functioning and progress of society is dependent on a uniform system of weights and measures. This facilitates the exchange of goods (trade), regulates our daily affairs, keeps us safe and improves our quality of life and also supports and enables the work on innovation. She gave the example of tiny nanometer size transistors, a rapidly evolving technology that is dependent on precision measurements and has changed the way that we work and interact; we now all have smartphones that use this technology, however without accurate measurements, the technology would not exist. Similarly, atomic clocks are another example of a transformative technology that has changed our lives and is reliant on accurate measurements: modern atomic clocks never lose a second in 100s of millions of years and this advance in precision has enabled the safe navigation and travel that we enjoy today.

These examples illustrate the importance of measurement standards, an essential pillar of the standards and conformance infrastructure, in enabling innovative technologies and play a crucial role in linking research and development to industry across the whole value chain from concept to development to manufacturing and to trade.

An example from the Singapore system was shown on how this is translated at a national level. In the Singapore system, the National Metrology Center is within A*STAR which connects with government industry business, research, and community stakeholders.

APMP is the Regional Metrology Organization that covers the Asia Pacific Region. Within APEC, we have two relevant regional metrology organizations: APMP and Interamerican System of Metrology (SIM), comprising the peak national measurement institutes within the geographical or economic regions of, respectively Asia and the western half of the Pacific (APMP) and the Americas (SIM). APMP was established in 1977, and is in fact the oldest continuously-operating regional metrology organization. APMP consists of 24 member economies with 42 institutes. The SIM members of APEC are Canada; Chile; Mexico; Peru and the United States; and the only APEC economy that is not a member of

the APMP or SIM is Brunei Darussalam which has recently approached APMP to become a member.

APMP's mission is to promote and support a measurement infrastructure in the Asia Pacific region that: facilitates international trade, improves industrial efficiency and competitiveness, ensures equity in the marketplace and enhances quality of life and the environment.

The region covered by APMP is in varying stages of economic development with many developing and emerging economies. More than 50% of APMP members are from developing economies, and many of them face development challenges and increasing pressure to provide an increasing range of internationally recognized measurement capabilities to support industry participation in global trade. The APMP region also includes six of the ten economies with the highest population in the world: China at about 1,4 billion; India 1,3 billion; Indonesia 258 million; Pakistan 193 million, Bangladesh 163 million and Japan 126 million. The APMP region also has three of the top of economies with the largest GDP: China; Japan and India.

A comprehensive measurement infrastructure is needed to ensure that measurements are accurate, comparable and internationally accepted. The Mutual Recognition Arrangement of the International Committee for Weights and Measures (the CIPM MRA) is the global framework under which national measurement capabilities are recognized. APMP together with other Regional Metrology Organizations like SIM play an essential role in assisting member economies in their regions to participate effectively in CIPM MRA processes. This ensures international recognition of measurement capabilities and reduces technical barriers to trade and enables global value chains.

APMP represents a large and diverse metrology capability across the fields of physics, chemistry and biology. APMP recently established Focus Groups to bring together these capabilities to address key regional challenges. Through a collaborative strategic planning process, APMP has identified the following thematic priorities: clean water, climate change, energy efficiency, food safety and medical metrology.

Finally, she mentions how APMP can help foster innovation in APEC economies. Dr Victoria Coleman says that a sound measurement system is an essential national infrastructure in enabling and facilitating innovation.

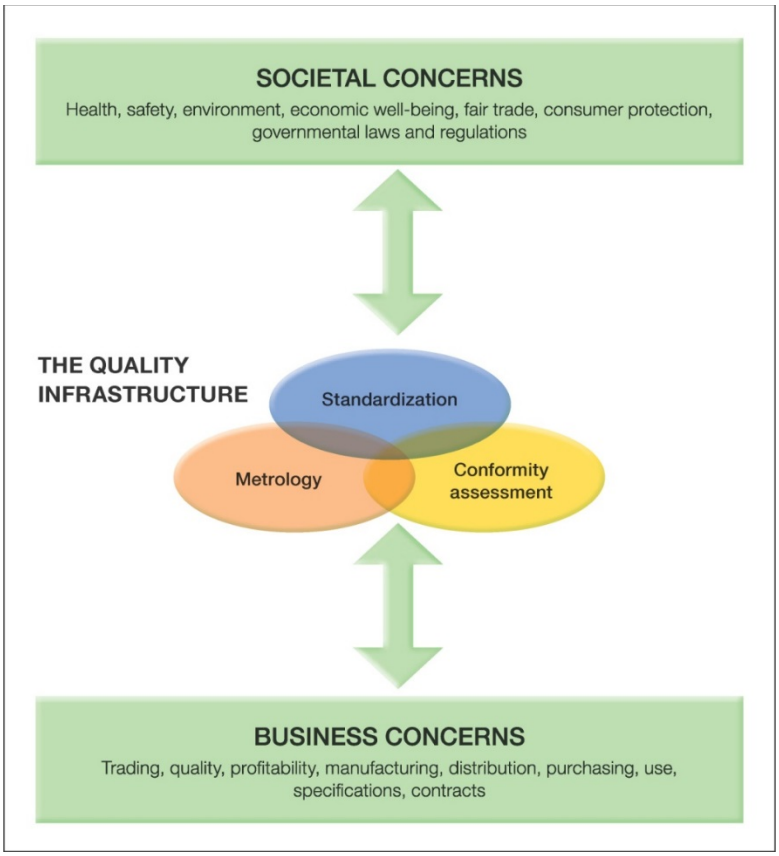
APMP is a resource to support APEC and member economies by, e.g.:

- Developing regional measurement capacity and capability and ensuring the effectiveness of the national measurement system as an essential element of the national innovation eco-system.
- Initiating and driving regional and leveraging international research collaborations and sharing of expertise/experience to support innovation.
- Contribute measurement expertise to regional policy and regulatory developments that underpin innovation.

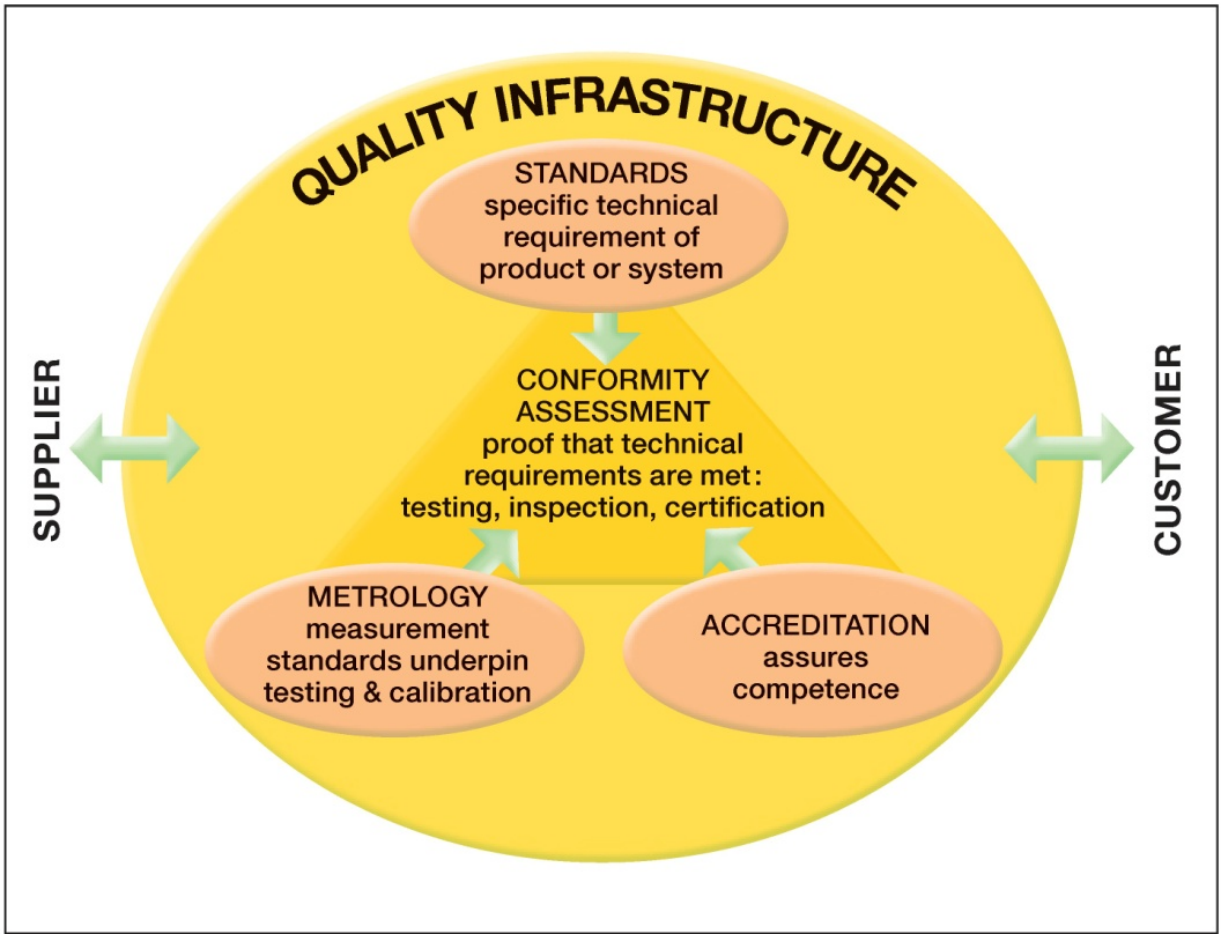
- **Accreditation and Conformity Assessment. Assisting Regulators and Specifiers**

The next presentation was given by Mr Wong Wang Wah, Asia Pacific Laboratory Accreditation Cooperation (APLAC) Chair. He talked about International Laboratory Accreditation Cooperation (ILAC) and International Accreditation Forum (IAF), the role of APLAC, and how the ILAC MRA works and how it benefits regulators and specifiers.

The quality infrastructure of an economy consists of three components as illustrated in the following diagram.



As illustrated in the diagram, the quality infrastructure addresses societal concerns (such as health, safety and environment) as well as business concerns (trading, quality, and profitability).



The diagram above shows how the three quality infrastructure components work together in conformity assessments. Accreditation provides a means to ensure that the conformity assessment bodies are competent and hence the results they produced are reliable.

In addition, the presentation talked about the ILAC and IAF. ILAC and IAF are 2 global corporations of accreditation bodies for accreditation of conformity assessment bodies. Their objectives are:

- Recognition of competent conformity assessment bodies through global multi-lateral mutual recognition arrangements.

- Harmonization of conformity assessment practices.
- Promotion of accredited conformity assessment as an effective mechanism for providing confidence in goods and services.

Regarding the ILAC and the IAF Mutual Recognition Arrangements (MRA), Mr Wong explained that accreditation bodies wishing to join the MRA are required to operate in accordance with the international standard ISO/IEC 17011 and other IAF or the ILAC MRA requirements documents. Under the MRA, signatories recognize the certificates and reports issued by conformity assessment bodies (CABs) accredited by the other signatories as equivalent to those issued by their own accredited CABs. Also, this provides the users of conformity assessment services with the assurance that these accredited CABs are competent and are operating to the same standard. MRA signatories have the obligation to promote the acceptance of the results issued by CABs accredited by their mutual recognition arrangement partners. The goal is to remove the technical barrier to trade by eliminating the redundant testing, inspection and certification.

APLAC was established in 1992. APLAC membership now includes all APEC members, except Chile, and non-APEC members in the Asia Pacific region such as Bangladesh, Buthan, Cambodia, the Gulf Region economies, India, Mongolia, Pakistan, Saudi Arabia and Sri Lanka. APLAC has 44 full members, some of them are not yet MRA signatories, and 10 associate members. APLAC has established MRA for laboratories, inspection bodies, reference material producers (RMP) and proficiency testing providers (PTP) accreditation.

APLAC's vision is to be a leading and respected authority providing reliable global solutions for the recognition of technical confidence. The APLAC MRA was established in 1997, with 7 inaugural signatories. ILAC established its MRA in 2000 and APLAC is one of the recognized regional accreditation cooperations. Being signatories to an ILAC recognized regional cooperation, signatories to the APLAC MRA can become signatories to the ILAC MRA and recognized internationally. The other recognized regional bodies are the European Cooperation for Accreditation (EA) and InterAmerican Accreditation Cooperation (IAAC). There are other regional cooperation bodies applying to ILAC to become a recognized body.

APLAC and ILAC expanded its MRA to include inspection body accreditation in 2003 and 2012 respectively. APLAC further expanded its MRA to cover RMP and PTP in 2007 and 2014 respectively. ILAC is in the process of establishing these MRAs.

Another significant subject of the presentation relates to the uses of MRA and its benefits to the regulators and specificers. The MRA provides governments with a credible and robust framework to:

- Facilitate government to government international trade agreements.
- Facilitate the achievement of the long term goal of "tested once, accepted everywhere".
- Minimise the cost of conformity assessments in trade.

The MRA also provides confidence to the market that uses conformity assessment results to make decisions. It reduces costs, enhances acceptability as well as facilitates faster market access. For manufacturers, the MRA provides a means for them to identify competent conformity assessment bodies. By using competent service providers, manufacturers can save cost and the results they obtained also enjoy wide acceptance globally.

In summary, regulators are increasing the use of accreditation as one of the criteria for acceptance of conformity assessment results.

Furthermore, accreditation is used in multi-lateral or bi-lateral free trade agreements (FTAs) between governments as a means for recognizing conformity assessment results.

Finally, the World Trade Organisation acknowledges that the international MRA among accreditation bodies is a means to eliminate technical barriers to trade.

1.3 Session 2: Discussion Policy on Innovation

- **Supporting Development of Standards in the Area of Cutting-edge Technology**

This presentation was given by Mr Mitsuo Matsumoto, Director of the Office for Economic Partnership for Standards and Conformity Assessment of the Ministry of Economy, Trade and Industry (METI) in Japan.

First, there was a general explanation on the organizational structure of the Japanese Industrial Standards Committee (JISC). The President of JISC always come from a private sector. Currently, Dr Hiroshi Tomono from Nippon Steel and Sumitomo Metal Corporation is the JISC

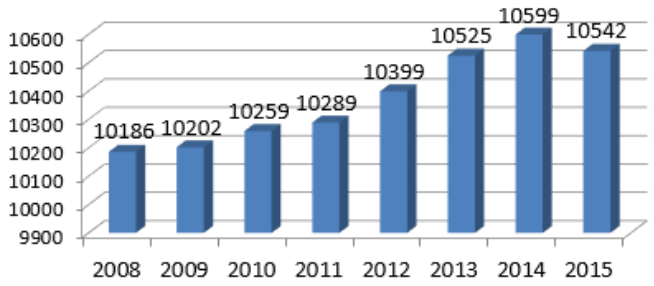
President. Under the JISC Council, we have three Boards and 22 Technical Committees. Each technical committee has 20-30 members, which means we have 500 to 600 committee members in total.

JISC itself is composed of well balanced stakeholders, such as people from academia, industries, and government organizations, while JISC Secretariat belongs to Ministry of Economy, Trade and Industry of Japan. They have currently around 100 people to take care of whole JISC activities.

The following graph shows the development of the number of standards in Japan:

- Total number of JIS: 10,542

As of March 2016



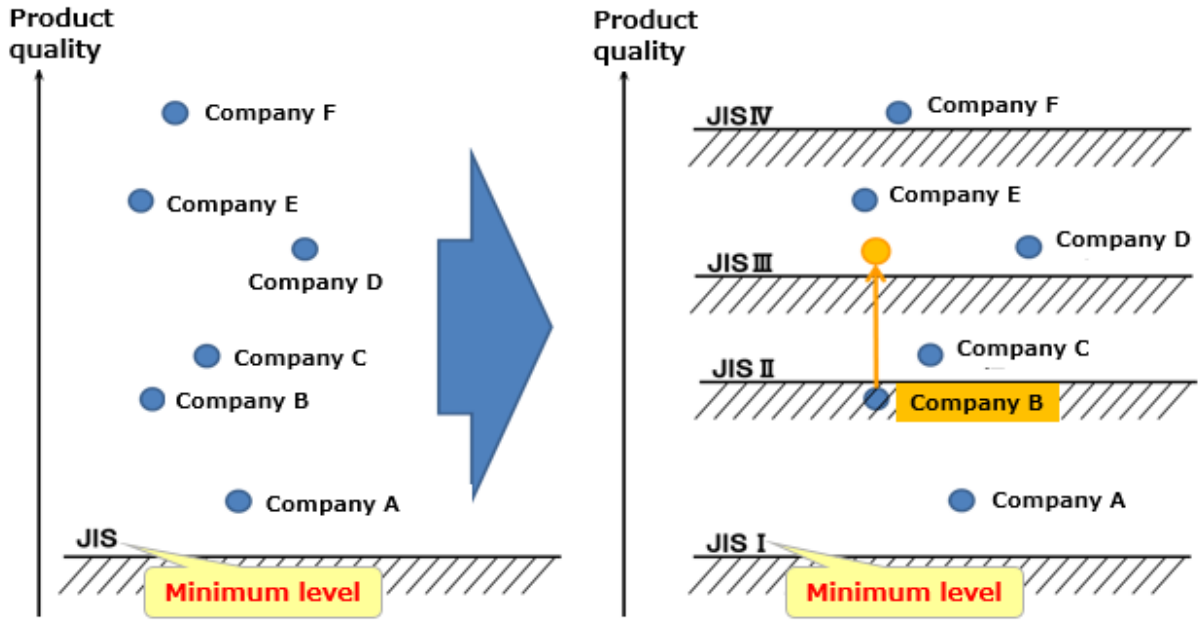
- Number of JIS being developed

FY	New	Revise	Total
2015	177	357	534
2014	143	358	501
2013	209	338	547
2012	170	392	562
2011	178	417	595

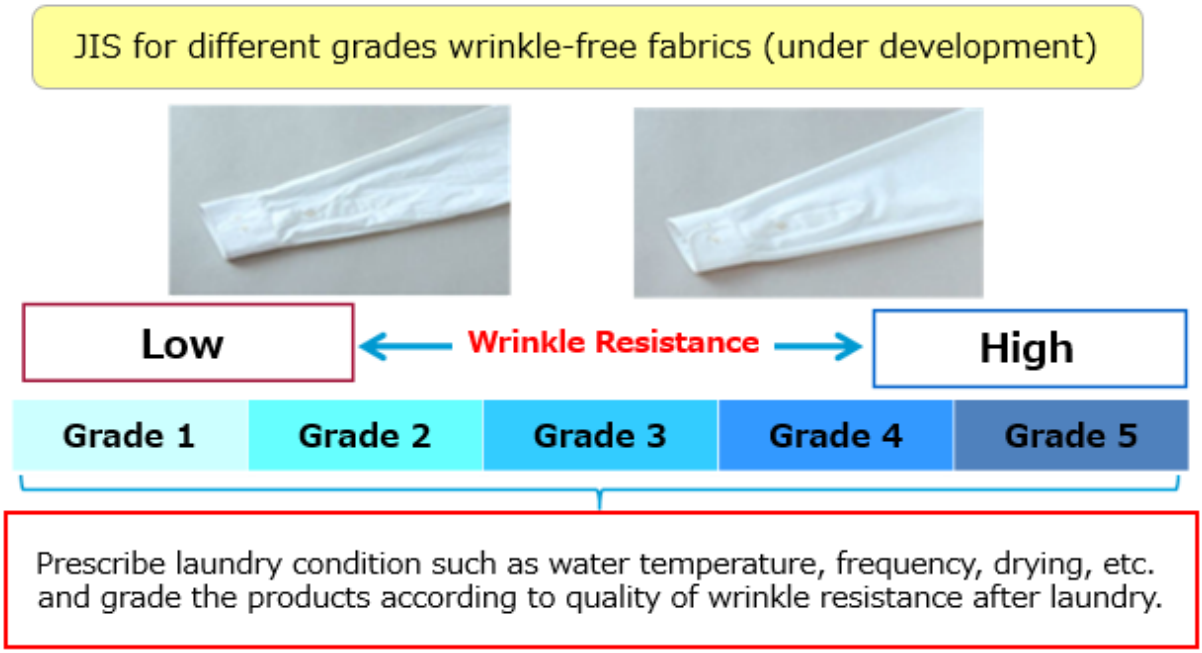
The number of Japanese Industrial Standards is now 10,542, and we are huddling around 500 standards every year.

They consider harmonization of JIS with international standards is vital. Out of 10,542 JISs, 5,759 standards have their corresponding international standards. Out of the 5,759 standards, 97% standards are harmonized.

The presentation explained on the policy tools aiming at supporting development of standards in the area of cutting edge technology. The first one is development of the so called high function standards.



Standards are developed at the minimum level, or as minimum requirement, so that most of companies can fulfill the requirement of the standard. As a result however, those companies who can provide higher quality products cannot demonstrate the high quality of their products by referring the JIS standard. This was one of the reason when some companies decided not to use JIS standards for their products because they didn't see the value to refer JIS standards. So, to cope with this problem and to encourage companies to develop higher quality of products, they started to create several levels of quality in a product standard as you see on the graph above. It is called high-function JIS scheme. In the standard, JIS 1 is set at the minimum level and JIS 4 is the highest level of quality or function. By referring JIS level 4, company F can demonstrate the high quality or high function of their products to consumers. In addition, this type of JIS standard will work to encourage companies at lower level, say company B in this case on the graph, to improve the quality or function of their products to achieve the higher level. In this way, JIS standards can facilitate technical development or innovation of products and technology by private companies.



The graph above shows an example of high-function JIS which are currently developing. It is a testing method of wrinkle-free fabrics with different grading of wrinkle resistance after washing such fabrics. The standard prescribes laundry conditions such as water temperature, frequency, drying and grade products according to the quality of wrinkle resistance after laundry.

ISO/FDIS-19095-Part 1, 2, 3 and 4 is an example of international standard being developed and proposed by Japan to evaluate a cutting-edge technology. This is a technology to joint plastics and metals much stronger than previous technologies which was developed by a small Japanese company. This kind of technology is applied nowadays for various IT products such as smartphones and tablet PCs. This is a test method standard, with which the company has been able to expand its market share of the technology.

To property evaluate cutting-edge technologies, Mr Matusmoto mentioned to be also studying the necessity to establish relevant quality infrastructures, such as testing laboratories or facilities in collaboration with their national research institutes. For the following 9 areas: Large scale energy storage system, Railway system, Personal care robots, Control system security, Large scale wind power generator, Regenerative medical techniques, Fine bubble, LED lighting and High-tech materials; they conducted feasibility studies, and established the Robot Safety Center in December 2010, and Control System Security Center in March 2012.

On the other hand, were established the Smart System Research Facility and the Safety testing facility for large scale energy storage (National Laboratory for advanced energy storage technologies). These two facilities are established very recently to evaluate renewable energy related technologies. Research and development of this area are very intensive in Japan, and they identified the needs of testing facilities especially for large scale equipment. Those are both established and in operation from April 2016. They are expecting several standards for testing or evaluation of such technologies will be developed and proposed either to IEC or ISO in the near future.

In conclusion, standards can be a strong supporting tool for innovation, through development of high-performance or high-function standards and by involving Small and Medium Enterprises (SMEs) with outstanding new technologies in standardization activity. It is also important to develop relevant quality infrastructures to properly evaluate such cutting-edge technologies.

- **Mexico´s program of Innovative Development for 2013-2018 (PRODEINN)**

This presentation was carried by Mr Bernardo Alejandro Estrada, Planning Director of the Secretary of Economy in Mexico. He started his presentation talking about the Mexican experience and it strategy for their economical development. Mexico counts with a National Development Plan which transmits the vision and strategy of their administration. Their major objectives of public policies are drawn and set out specific actions to achieve them. Mexico seeks to make a society of rights, where everyone has effective access to rights granted by the constitution.

Their National Goals focus on Mexico in Peace, Mexico Inclusive, Mexico with quality education, Mexico Prosperous and Mexico with Global responsibility. The last two goals are aligned with the economic strategy. In order to make Mexico prosperous, the following actions are proposed:

- Maintain macroeconomic stability.
- Democratize access to financing projects with growth potential.
- Promote quality employment.

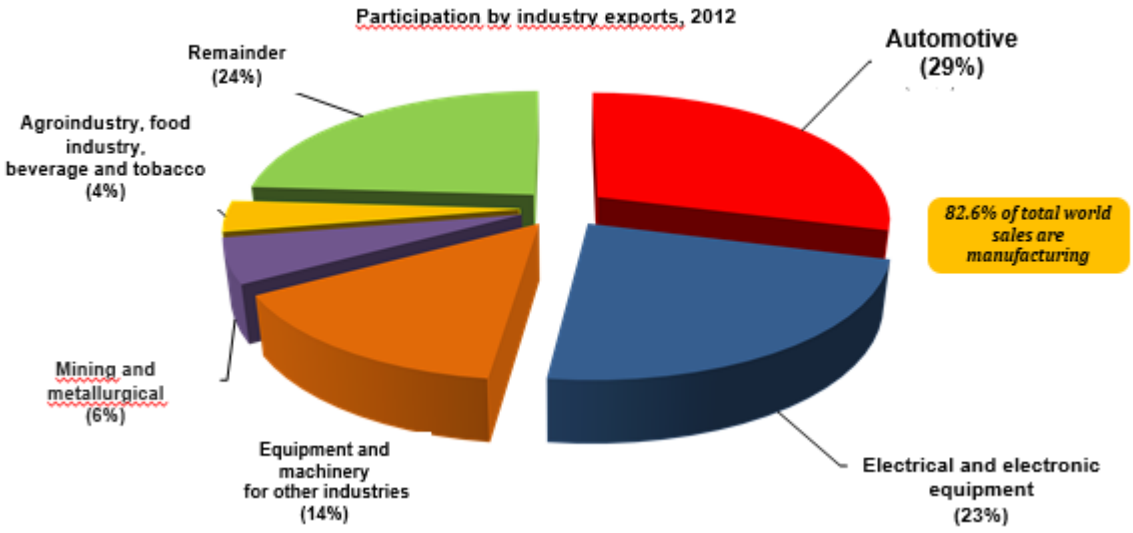
And to ensure Mexico's Global responsibility, the following objectives are taken into account:

- Expand and strengthen the presence of Mexico in the world.

- Promote the value of Mexico in the world through economic, tourist and cultural diffusion.
- Reaffirm the economy's commitment to free trade, mobility of capital and productive integration.

In order to accomplish with the National development Plan for 2013 and 2018, different transveral programs have to be implemented. This is where the PRODEIN comes, which are the initials in Spanish for the Program of Innovative Development for 2013 to 2018. This program considers the implementation of a policy of industrial, commercial promotion and services.

In the last 30 years, it has been an important boost to the policy of trade liberalization in Mexico. The change in the production structure in Mexico resulted in disparities between economic sectors, as it is shown in the following graph:



The PRODEINN seeks to change the production structure of Mexico through:

- Industrial policy, trade promotion and service, with an open economy approach.
- Strengthen the internal market.
- Integration into global vaue chains.
- Balanced economic growth by sectors, regions and companies.

Mr Estrada also mentioned that Mexico had 5 sectorial objectives:

i. To develop a policy of industrial development and innovation to promote balanced economic growth by sectors, regions and companies.
ii. Implement a policy that fosters innovation in trade and services sector, with emphasis on knowledge- intensive companies.
iii. Encourage entrepreneurs and strengthen the business development of MSMEs and agencies of social sector of the economy.
iv. Promote greater competition in the market and move towards a comprehensive regulatory reform.
v. Increasing international flows of trade and investment as well as domestic content of exports.

In order to reach its objetives, a new industrial policy development and Innovation, aimed at promoting the development of 29 strategic sectors of the economy, through three strategies is being carried:

- Cluster development.
- Provider development,
- and innovation promotion.

A supplier development Model of the Energy Industry to boost its development, from the entry into force of the Energy Reform, is also on the run, considering four major components:

i. Estimating the demand for the supply of the domestic industry.
ii. Identification of strategic activities and identifying opportunities for the development of suppliers.
iii. Transversal strategies to enhance industrial competitiveness.
iv. Compliance programs of National Content.

Different indicators has been established to measure the progress of the Program of Innovative Development at 2018:

- Total factor Productivity of Manufacturing Industries – From 100 to 106.
- Mexico's score in Pillar Sophistication Business of Global Competitiveness Report of World Economic Forum – From 4,24 to 4,54.
- Mexico's score in the variable Ability to Innovate of the Global Competitiveness Report of the World Economic Forum – From 3,5 to 3,7.

- Unlike the annual growth rate of total gross production of MSMEs[9] over the previous period – From annualized growth rate of MSMEs obtained from the Economic Census 2014 to the end of the period of additional percentage points to the baseline.
- Participation of women in productive activities funded resources provided by FINAFIM, which is a special financing government program – From 82 % to 87 %.
- Number of days to register a company – From 9 to 5.
- Mexico's score on the variable intensity of local competition of Global Competitiveness Report of World Economic Forum- From 5,05 to 5,38.
- Mexico's score in variable Impact of Foreign Direct Investment Rules in Business of Global Competitiveness Report of World Economic Forum – From 4,83 to 5,77.
- Measuring the burden of regulation – From 4,25% to 3,15% .
- Foreing Direct Investment – From 131,3 mmd to 157,6 mmd.
- Domestic content of exports of the Manufacturing, Assembling and Export Services – From 30% to 36 %.
- Degree of trade openness of the economy of Mexico – From 63% to 70,5%.

Annualy during the months of January and February, a document with a report of the achievement of the strategies is published on the website. In this document, the actions performed are specified, as well as the monitoring of these. This allows Mexicans to observe in a public way the advances that are made in the economy sector.

- **Strategy for American Innovation**

This presentation was given by Mr Kent Shigetomi, Director for Multilateral Non-tariff Barriers Office of the United States Trade Representative (USTR).

The presentation started by an introduction to innovation. He stated that innovation refers to an idea, embodied in a technology, product, or process, which is new and creates value. To be impactful, innovations must also be scalable, not merely one-off novelties. The "Strategy for American Innovation" focuses on two broad categories of innovation:

- Innovation to drive economic growth and address national priorities.
- Institutional and public-sector innovation.

Also, he explained how innovation drives a nation:

- Creates quality jobs, drives productivity growth and lasting economic growth.
- Catalyze breakthroughs for national priorities such as precision medicine, health care innovation and advanced vehicles.

[9] MSME: Micro, Small and Medium Enterprises.

- Create a more innovative government with and for the people.
- Fuel the engine of private sector innovation.
- Incentivize and encourage creativity and tap into “undiscovered talent”.
- Invest in the building blocks of innovation through education and research.

The strategy for American Innovation was first issued in 2009, later updated in 2011 and 2015. It aimed to keep America competitive at the technological frontier, drive economic growth and shared prosperity for the future and ensure that all citizens are benefiting from the innovation economy.

Although companies must ultimately invest a great deal to commercialize emerging technologies, the new insights, early prototypes and the first markets for them are often initially developed by the Federal Government: Internet, global positioning system, speech recognition, electronic design automation for advanced microprocessors, artificial intelligence for digital assistants.

The building blocks of the American innovation ecosystem are those areas where Federal investments provide the foundational inputs to the innovation process:

- Making investments in fundamental research.
- Boosting access to high quality STEM education.
- Building a leading 21st Century infrastructure.
- Building a Next Generation Digital Infrastructure.

Additionally, the Federal Government can empower private-sector innovator by addressing the market failures that stymie innovative activity and by ensuring framework conditions friendly to experimentation and innovation, including:

- Strengthening the research and experimentation tax credit.
- Supporting innovative entrepreneurs.
- Ensuring the right framework conditions for innovation.
- Empowering innovators with open federal data.
- From lab to market: commercializing Federally-funded research.
- Supporting the development of regional innovation ecosystems.
- Helping innovative businesses compete abroad.

The presentation mentioned the importance of empowering a nation of innovators. The federal government can help empower more Americans to be innovators:

- Harnessing the creativity of the American people through incentive prizes.
- Tapping the talents of innovators through making, crowdsourcing and citizen science.

Innovation has a wide variety of benefits to the nation's economy. Creating quality Jobs and lasting economic growth is one of them. Technological innovation is one of the source of economic growth for the United States. Coordinated Federal efforts can have large impact on jobs and economic growth in the following priority areas:

- Sharpening America's edge in advanced manufacturing.
- Investing in the industries of the future.
- Building an inclusive innovation economy.

Also, maximizing the impact of innovation priorities means identifying those areas where focused investment can achieve transformative results to meet the challenges facing their nation and the world through:

- Tackling grand challenges.
- Targeting disease with precision medicine.
- Driving breakthrough innovations in healthcare.
- Promoting clean energy technologies.

Additionally, with the right combination of talent, innovative thinking, and technological tools, government can deliver better results with and for the American people.

The federal investments supports research and development which is the building block of innovation, this includes research that is funded by the federal government and universities as well as federal laboratories to create the right digital and physical infrastructure, as well as creating the right policy and regulatory environment, which is important to private sector investment. In addition, the federal government creates the right policy and regulatory environment essential to private sector investment. This includes intellectual property protection, antitrust laws and how address emerging technologies.

In the innovation strategy, standards play a role. Proposed budget targets resources to areas that are most likely to contribute to the creation of transformational knowledge. In this sense, has been budgeted USD 67 billion for basic and applied research, including three key basic research institutions:

- National Science Foundation.
- Department of Energy.

- The Laboratories at the National Institute for Standards and Technology.

General-purpose technologies are innovations that have a pervasive impact on economies and societies, such as the steam engine, electricity, interchangeable parts, the transistor, and the Internet.

The Strategy places a priority on the United States leadership in the development of these technologies because of their potential to create entirely new industries, create jobs, and increase productivity.

Investments of research and development should be made in areas that have the potential to be general-purpose technologies.

Multi-agency research initiatives help allow the government to provide complementary and mutually-reinforcing kinds of support such as:

- The development of standards.
- Industry-led consortia to invest in pre-competitive research.
- Fundamental research at universities.
- Applied research to support agency missions in areas like health, energy, transportation, and national and homeland security.

In conclusion, innovation and technological change are the most important drivers of productivity growth and, in turn, long-run economic growth. The Strategy for American Innovation is guided by the goal of achieving shared prosperity. This involves giving all Americans access to the tools and opportunities to contribute to and share in the prosperity created by the 21st century economy. Finally, the innovation ecosystem requires not only the risk-taking and vision of the entrepreneur and the ability of the corporation to scale these innovations, but also the foundational “building blocks” of innovation in which the Federal Government invests.

- **Increasing competitiveness in companies through innovation projects cofinancing and Quality Management Systems certifications**

The last presentation of the first day of the conference was given by Mr Erich Inguil, Executive of the National Program of Innovation for Competivity and Productivity of Peru (known as Innovate Peru).

The presentation mentioned the objectives of Innovate Peru. First, to increase innovation in enterprises production processes, then to promote innovative entrepreneurship, and finally, to facilitate the absorption and adaption of technologies in enterprises.

The program management is in line with international best practices, so they have a directive council with representatives of public, private and academic sector. The selection of projects of companies and universities is made through open public announcements and based on merit. The Project evaluation is performed by independent experts. During implementation phase ongoing projects are tracked. The disbursement is subject to progress. Also, a semi-annual management charge subject to external audits is made by the Controller General of the Peruvian Republic and the Inter-American Development Bank. Therefore, during this learning curve with continue interventions over time, allow to grow up and interrelationship with the ecosystem entities to strengthen this outcomes.

Since the beginning of the institution, there has been good results. There were about 1893 projects by Innovate Peru by June 2016, belonging to different scopes such as enterprises, strengthening of the ecosystem, entrepreneurship, human capital and investigation.

Additionally, Innovate Peru manages 4 different funds: Innovation for competitiveness project; Research and Development Fund for Competitiveness; Fund for Innovation, science and technology and the MSME[9] fund. Regarding, innovation project features 70 % of the enterprises implemented their projects associated with research entities, 60% of the enterprises were SMEs[10] and 50% of the projects came from the Peruvian regions. The strongest areas were related to IT[11], with 29% of the projects, followed by biotechnology 13% and farming 13%.

For every USD invested in Innovate peru, the State recovers USD 7,1 through direct sales taxes of the project product over a period of 5 years.

[10] SME: Small and Medium Enterprises.
[11] IT: Information Technology.

In conclusion, the main achievements of this Peruvian Program of Innovation institution has been:

- Mitigate the shortage of resources for science, technology and innovation.
- Stimulate technological innovation in enterprises.
- Promote trust between companies and research entities.
- Strengthen research capacity in universities and R & D[12] centers.
- Support decentralization capacity of R & D[12] in the economy.

1.4 Session 3: Accreditation supporting innovation

- **Innovation on Accreditation - reducing regulatory burden**

The presentation was given by Mr Roslan Alias, Senior Principal Assistant Director of the Accreditation Division of the Department of Standards Malaysia.

Mr Roslan started his presentation by presenting Standards Malaysia, which is an agency under the Ministry of Science, Technology and Innovation (MOSTI). It is divided in a National Standards Body and a National Accreditation Body.

Its main functions in standardization is to:

- Implement policies and strategies for national standardisation;
- Recommend Malaysian Standards for approval;
- Promote the usage of Malaysian and international standards;
- Represent Malaysia in regional and international standardisation activities; and
- Promote co-operation in standardisation activities within the economy as well as with regional and international organisations.

Its main functions in accreditation is to:

- Accredit organisations engaged in conformity assessment activities: testing, calibration, inspection and certification of products and systems;
- Maintain a register of accredited organisations and their marks of conformity;
- Represent Malaysia in international and regional accreditation activities; and

[12] R&D: Research and Development.

- Facilitate international and regional recognition of accredited organisations and certificates.

Regarding the accreditation schemes, in Standards Malaysia these are open to any laboratory, certification bodies and inspection body irrespective of its application - private, government or in-house.

Accreditation benefits government and regulators because:

- Regulations could rely on accredited bodies;
- Reduce uncertainties;
- Remove duplicate audit;
- Increase public confidence.

Regarding the innovation on accreditation, on 27 October 2004, the Cabinet approved 3 recommendations on the enhancement of accreditation activities in Malaysia, which are:

i. Regulators to make it compulsory on the usage of accredited test reports and certification under the current accreditation system of Standards Malaysia or any other accreditation system recognised by Standards Malaysia;
ii. Standards Malaysia to be recognised as the national accreditation body for all conformity assessment activities. In relation to this, all testing and calibration laboratories and certification bodies operating in Malaysia are required to obtain accreditation from Standards Malaysia; and
iii. The Government is to give support to the laboratories and certification bodies accredited under the national accreditation system or other accreditation systems recognised by Standards Malaysia.

The Amendment of ACT 549 given in 2012, establishes by cooperation with the relevant agencies, to facilitate the development of technical regulations and to promote principles and procedures for the implementation of technical regulations and confomity assessment.

The accreditation scheme has been improved by:

- The creation of an electronic accreditation system.
- Reducing the frecuency of the assessments.

- Combining assessments.
- Designing new accreditation schemes to meet regulatory needs.

Additionally, and accreditation committee has been established, with members derived from Government agencies, academic institutions and industries, for a term of 3 years.

Finally, the National Standardization and Acrreditation framework (NSAF) which has been created in 2016 to last until 2020, establishes the need and demand for minimum quality assurance, to reduce trade barriers and also meet regulatory requirements, to enhance the credibility of the conformity assessment activities, to strengthen engagement amongst international networks through increased participant of stakeholders, to monitor and maintain the competence of Standards Malaysia accredited conformity assessment bodies and to develop human capital to sustain credible, competent and coherent accreditation services.

In Malaysia there are 11 regulators that recognized accredited conformity assessment bodies in different products and services such as: Electrical products, water and severage services, food safety, medical device products, quality and safety of fish, palm oil industries, safety of toys, pneumatic tyres, helmets, consumer products, safety of animal foods, environmental testing, mercury management in oil & gas industry, construction & building material and government procurement.

The accreditation body of Standards Malaysia counts with regional and international recognition from APLAC[6] MRA, PAC[13] MLA, ILAC MRA, IAF MLA and MRA/MLA[14].

- **Accreditation of Innovative Technologies for Housing**

This presentation was given by Eng. Jovita G. Panopio, Secretariat Head of Accreditation of Innovative Technologies for Housing (AITECH) of the National Housing Authoritity of the Phillipines.

The presentation started with some history of AITECH. It was created in 1990 and continues along until 2016. It has as objectives to assist producers of innovative technologies in securing acceptance of their products or systems in the market as well as to make these technologies acceptable for funding under the government's housing loan program, and to encourage and promote the use of innovative technologies as an alternative to traditional housing construction

[13] PAC: Pacific Accreditation Cooperation.
[14] MLA: Multilateral Recognition Arrangenment.

system.

There are eleven government member agencies of AITECH:

1. The lead agency is the Housing and Urban Development Coordinating Council or HUDCC.
2. Department of Science and Technology, the DOST.
3. The National Housing Authority.
4. The Home Guaranty Corporation.
5. Home Development Mutual Fund.
6. National Home Mortgage Finance Corporation.
7. Construction Industry Authority of the Philippines.
8. The Housing and Land Use Regulatory Board.
9. The University of the Philippines, bureau of research and standards.
10. The Department of Public Works and Highways (DPWH).
11. The DTI, Department of Trade and Industry, the Bureau of Product Standards specifically.

The criteria that issues for accreditation complies to the housing standards based on BP 220, PD 957 and the National Building Code, structural evaluations, cost effectiveness based on the resulting construction costs as compared with housing unit built with conventional building material/systems and appraisal of housing units using the technology for mortgage acceptance by funding institutions. Additionally, the physical properties and structural soundness of technologies in relation to health considerations and suitability to local climatic and topographic conditions, consistency of required quality in mass production, and availability of raw materials locally for the production/ use of particular technologies.

In new technologies are considered: New production process of existing materials or system, new construction techniques, building materials designed to serve as alternative to traditional or conventional component and/or has not passed the Bureau of Product Standards, nor has any approved the Philippines National Standard (PNS).

The accreditation benefits are:

- Assistance in the promotion and commercialization of their products.
- Aitech accreditation is required in securing acceptance of said technologies by financing institutions.
- Tax Holiday will be granted by BOI for mass housing projects which will be utilizing AITECH Accredited Technologies.

Regarding AITECH Certificate effectivity for technology that has or is being used in an on-going projects could be issued from 1 to 3 years validity of the AITECH accreditation. On the other hand, technology that has not been used in any housing project could be issued only 1 year validity.

The advantages in using innovative materials and systems are the lower the cost of construction, reduce labor and construction time, easier construction method and material wastage is minimized. So most of the accredited technologies are modular in nature, thereby reducing the material wastage. There are 2 kinds of accreditation: one is materials only, and the other one is building system. When talking about materials only, it refers to non-structural building materials of construction: it can be a wall, can be roofing, but it is non-structural, so it is only for cladding. But, when applies for building systems, it forms a structural component of the structure and there are several requirements in the application, such as testings that have to be done, for them to submit the best results, especially for wall systems, the fire resistance is needed, and then also the strength of materials of that certain building material, and additionally cost analysis compared to conventional system. If all those checks are compiled, then the AITECH secretariat issues an order of payment for the evaluation fee and then receive all the documents and starts the evaluation.

How were technologies mainstreamed in National Housing Authority (NHA) housing projects?

- In the aftermath of Typhoon Yolanda, many new technologies were submitted to the Aitech Committee for accreditation. To date there are 66 accredited technologies.
- Upon the instruction of then President Aquino all housing units in NHA resettlement sites/projects must pass through the approval of the DPWH, whether using new or conventional materials.
- Likewise in view of the new normal, structural standards must comply with the new parameters for construction.

In summary, NHA current initiatives:

- Changed design parameters for typhoon resiliency and coordinated with DPWH.
- Adopted the resilient designs in 2017 work program for all areas nationwide (not just for typhoon Yolanda).
- Approved the community based shelter and livelihood program (Cbsl) for Island Barangays in The Visayan Region.
- Approved the Memorandum Circular on site selection, suitability and site planning for NHA Projects.
- Adopted new technologies for housing models in coordination with DPWH and

conducted hands on training for technology transfer.

On the technical issues and challenges:

- Some conflicting design parameters for the different types of calamities, typhoon resilient but is it earthquake proof as against green building principles. How to address them all together?
- Lack of suitable lands for housing if overlaid with all the hazard maps such as flooding, erosion, landslides, and including protected areas.
- Mitigating measures and engineering interventions in extreme cases may cost more than the usual allowable budget for government projects.
- Housing developments on low land areas may affect food security in the long term (conversion of agricultural lands to residential uses).
- Increase on the budgetary requirements to allow for the changes on design and construction to follow resiliency (i.e 1% of an agency's budget is allocated for accessibility as directed by government).
- Vertical housing developments need to be understood/appreciated by the low income group as a permanent housing tenure solution especially in highly urbanized areas.
- Government to balance between the increasing demand for housing versus the speed and quality of housing deliveries.

Eng. Panopio ended the presentation with some personal notes on resiliency. She mentioned that resiliency is not just about strength of buildings but also on the location/choice of sites and on the way these are planned. Additionaly, building the resiliency of communities who are directly affected by calamities and the effects of climate change. Therefore, community/housing development programs must always be geared towards this direction. Finally, community participation is the most often repeated phrase and must be part in any endeavor both by the government and the private sector, even with the use of new technologies.

1.5 Session 4: Case Studies on Innovation – Part 1: Energy and Electro Technical Sector

- **Electricity Access for all: IEC International Standards for Inclusive Development**

This presentation was given by Mr Vimal Mahendru, Convener of the IEC Systems Evaluation Group 4 (SEG4) for Low Voltage Direct Current Applications – IEC Ambassador. His

presentation was about accessibility to electricity; especially in those developing economies which have large numbers without any access to electricity at all.

Currently most technologies and electronical devices run on Direct Current (DC). However, in the past there was a dispute on which energy source was the best one, DC or Alternating Current (AC), both with different characteristics and uses. From this dispute is where the Low Voltage Direct Current (LVDC) is created and especially makes sense considering that source for energy, storage batteries and consumption devices are predominantly working in the LVDC environment.

Through the years, there have different milestones regarding the use of energy. Firstly, AC predominated due to its ease for transportation. Nonetheless, this trend has been changing owed to the advances of technology and the use of DC through the use of devices which are technologically more efficient. From this analysis, LVDC is focused on its use of different electronical devices. The use of DC resurges in 2000 with the advance of technology, energy generation and energy efficiency of devices.

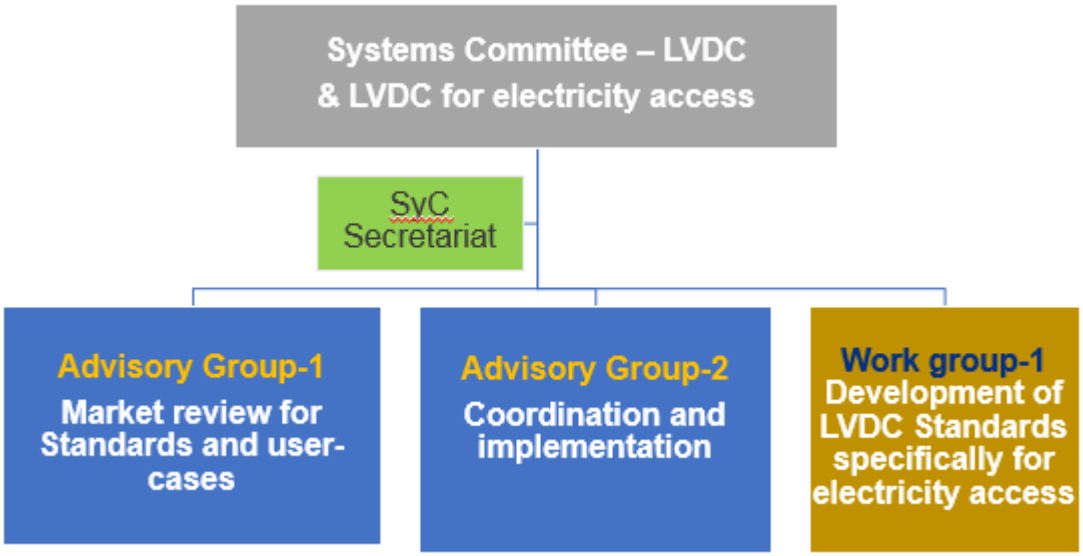
The United Nations and all the bodies have been increasingly focusing on issues related to energy, energy efficiency and the pollution. These have been additional drivers taking people from zero direct current which is polluting technologies to world solar photovoltaic (PV) which is zero pollution and that is why it can be closer to the place of consumption.

In the world, 1 out of 5 people has direct access to electricity. Poverty is correlated to energy consumption per person. The initiative of the LVDC systems is focused on the more efficient access of energy to the poorest places.

Inside IEC, there is a branch of standards that focus on LVDC energy through the design, equipment and installation, among others. These LVDC systems are harmonized with the development of the generation of renewable energy such as PV solar energy, wind generated power, among others.

Currently, there is a new level of collaboration. Traditional Technical Committees (TC) to TC bilateral liasons have reached their limits, driven by convergence, rapid innovation and transversal use-cases.

The structure of the systems committee was shown in the following organizational tree:



In conclusion, Mr Mahendru mentioned the following:

- Standards and Innovation support each other.
- LVDC is happening and it will touch all areas of electricity.
- LVDC standardization work has commenced, especially Electricity Access.
- LVDC makes sense for developing and developed economies.

- **Gasoline to LPG Converter kit for small fishing boat engine**

This presentation was given by Mr Donny Purnomo, Acting Director of Accreditation of Certification Body - National Standardization Agency of Indonesia (BSN). His experience was about a Gasoline to Liquified Petroleum Gas (LPG) converter kit for small fishing boat engine.

As background information, they had high prices of gasoline caused by difficulties in the distribution of gasoline for fishing boats in remote coastal area of Indonesia. This caused high cost for firshermen to operate fishing boats. In order to solve the problem, the government established a program to convert the use of gasoline to LPG as a fuel for fishing boats. The energy conversion program for fishing boats is further steps following successful energy conversion program for home appliances in 2007. It is important to say, that all the gasoline to LPG converter kits for automotive engines available in the market are imported products.

There is a challenge from the government procurement plan (President Decree No 126-2015) on the provision, distribution and pricing of Liquified Petroleum Gas (LPG) for small fishing boats up to 5 GT:

- Procurement of conversion package comprises converter kit and its installation and LPG cylinders.
- Converter kit is defined as a set of components to convert the use of gasoline to LPG for fishing boat's engine.
- Converter kit and LPG cylinders shall meet the National Standard of Indonesia (SNI) requirements.
- When SNI have not been available, they shall meet relevant international standards.

This brought the definition of new problems. What is the availability of SNIs? Of relevant international standards? Of relevant testing laboratories? Of product certification bodies? Of relevant certification schemes? Products specification and any standards referring in the product development process? For this reason, it is very important to count with standardization and accreditation for making these innovations. It should always be part in the process: from "patent" to "mass product certification".

Based on the definition of problem, it was identified the major converter kit components wihich are a LPG cylinder, LPG regulator, LPG hoses, LPG vaporizers, and LPG carburettor, LPG android unit, MAP sensors, injector, among others. It was identified also the existence Indonesian Standards and other national standards such as EN 12806 automotive liquefied petroleum gas components other than containers and they also have identified the existing testing laboratory. Based on existing standardization and conformity assessment system, they still need to develop a product certification scheme and they still need to identify the type testing and functional testing scheme for the existence domestic products and of course to get this prototype into the mass production systems. So, Mr Purnomo took one example for the fully mechanical vaporizer, it has been protected and patented in according with the Indonesian Law and to make sure that the system is working well the Indonesian Institute of Science bring this product into the full testing using the small fishing boats and then simultaneously Indonesian Institute of Sciences also develop a testing facility. The tests carried out were: leak testing, vibration testing and also engine performed testing to compare the performance of engine while the use of gasoline and when the gasoline is replaced with the LPG and also to compare the composition to make sure the conversion is not deteriorating the environmental. After that and then they made the specification for products, profound evaluation, mass production, and also factory inspection and certification.

This is a simple experience for the interaction between the Indonesia's Quality Infrastructure to facilitate the innovative products into the competitive advantage products into the Indonesian market as well into regional or international markets.

- **Importance of the Lab tests and Standards in the Development and Innovation of Technical Products**

The presentation was given by Eng. Wilber Aragonez, President of Directive Council of Productive Innovation and Technological Transfer Center (CITE) Energy of Peru. He started his presentation by stating that being part of a globalized system is very important for commercial exchange, technological innovation and in some way for the equality of all the actors. As we know, the advancement of technology and modernity allow the development of new electronic and industrial equipment to the world, creating benefits for all actors of the work. The importance of the standards, for example, in the area of product development, is based on the satisfaction rules of the consumer, the developers and also the users. In this way, CITE Energy, which navigates in the electrical industry, develop products in the electricity and high tension areas, as well as provide services for testings and buildings. For these we have to be aligned to standards and main guidelines, which come from the conception of a product. When someone wants to develop a product, a solution to a determined problem or necessity, the first thing to be done is always focus on the international standards, in special IEC standards, to verify the parameters and rules that establish them.

The process that developed economies usually perform is to extract raw material from mining plants, to be followed by the foundry, engines machines and finally finishes in electric cars. Peru is reach in raw materials, especially in minerals and chemicals. However, the raw materials should not be only exported, but transformed with technology, offering it a value added product. The work done with it goes from production to qualified technicians, developers, designers, engineers, investors, generating profit for everyone. For this, it is very important to count with modern government policies, legal stability, modern education, health protection, energy development, technology development, development of technological products and environmental awareness.

The CITE Energy has been created to help its customers, businessmen and other stakeholders to overcome the difficulties and obstacles that has the energy sector. Because of its considerable the impact in the technological development and educational development of the sector, the Energy CITE becomes in an important participant productive progress of Peru to serve Peruvians.

CITE Energy wants to be a fundamental pillar of national technological growth in the energy sector through its development and efficient management in the generation, transmission and distribution of electricity, primary resource for other industries. The pillars of the CITE are technology transfer, training, articulation of actors, dissemination of information and R&D.

Regarding technological transfer, CITE Energy has the following specialized laboratories: High voltage, medium voltage, low voltage, thermomechanical, corrosion, aging and smart grid automation.

In conclusion, the CITE is an organization that promotes innovation through quality standards, counting with specialized laboratories to give reliability to the services they offer. Their commitment involves the integration of actors within the energy sector through cooperation agreements and roundtables that bring together the Government, companies and universities. It also involves disseminating relevant information for the sector.

With the direct support of the state through the Ministry of Production and the Technological Institute of Production of Peru, they are able to offer services at competitive costs internationally. CITE energy want to become the reference center in the national and regional energy sector.

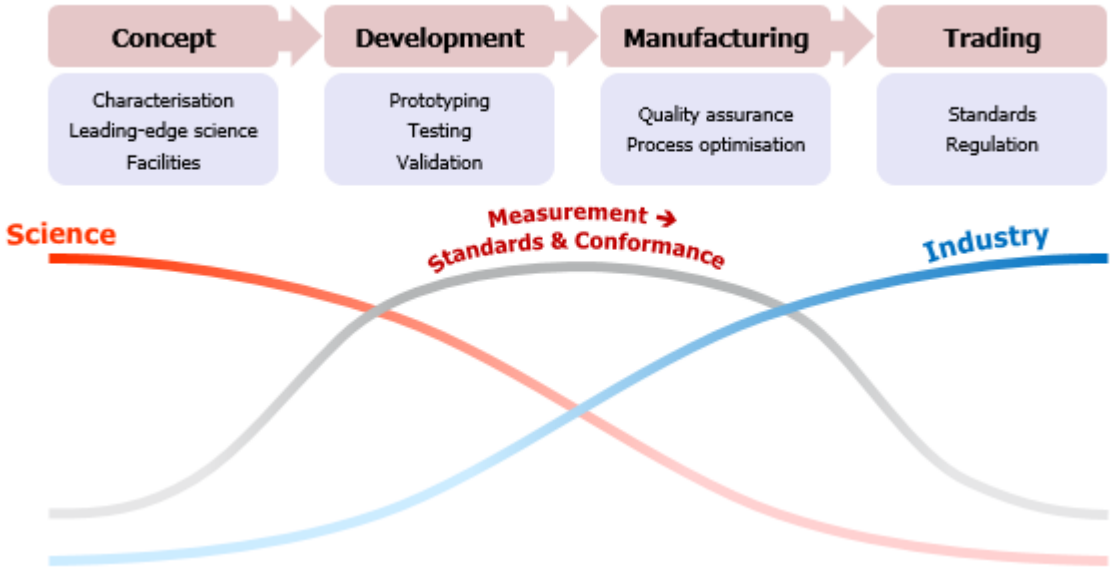
1.6 Session 5: Case studies on innovation – Part 2: Metrology

- **The role of nano- and bio-measurement in support of innovation in Australia**

The presentation, which was given by Dr Victoria Coleman, Acting Section Manager of Nanometrology at the National Measurement Institute Australia (NMIA), on the role of nano and bio measurement in support of innovation for Australia.

Innovative technologies, such as bio and nanotechnology, typically have the following characteristics: they are disruptive, rapidly evolving, exploit e.g. new material properties to give novel features or applications, enable further technology development, are sustainable, often “personalized”, readily available, and may be high through-put. These technologies arise from a scientific research and development phase and are translated to an industrially viable product.

Sound measurement, as a key component of the standards and conformance infrastructure, is an important enabler of this translation process, as illustrated in the following chart:



From this chart, we see that accurate, precise, comparable and recognized measurements (i.e. a strong measurement infrastructure) supports innovation by bridging the gap between science/research and industry. Internationally recognized measurement standards help industry move through the translation phase by supporting product development, facilitating trade, underpinning quality control and safety, and assisting people make informed choices about new technology. This means that competitiveness and innovation is enhanced, TBT[15] are reduced, trade is fair, and development is safe, responsible and sustainable.

The National Measurement Institute Australia (NMIA) supports Australian nano- and bio-industry by developing measurement capabilities in these emerging areas.

In nanotechnology, NMIA undertakes fundamental research and has developed a characterization facility to provide measurement infrastructure for this emerging technology. NMIA works with industry and regulators to characterize and help manage complex nano-materials, and with instrument manufacturers to assess new measurement technologies.

It was explained that there are some economies (e.g. European Union) where regulations on the use of nanomaterials in products are emerging. These regulations incorporate both a size and an amount of material that must be present for a substance to be classified as a nanomaterial. In order to support these regulations and trade with economies that use such regulations, accurate and recognized measurements of nanomaterials are required.

[15] TBT: Technical Barriers to Trade.

Currently, standardized methods for measuring materials in order to address such regulations are still in development. NMIA participates in the development and validation of such measurements in a number of ways, including through active participation in documentary standards as well as nanoscale measurement standards development.

NMIA actively contributes to the development of documentary standards for nanomaterials through participation in ISO Technical Committee (TC) 229 Nanotechnologies and the corresponding Australian mirror committee, NT-001, facilitated by Standards Australia. In particular, NMIA continues to maintain active interest in the activities of ISO TC 229's working groups (WG) 1, 2 and 3, which cover Terminology and Nomenclature, Measurement and Characterization and Health, Safety and Environmental aspects of Nanotechnologies, respectively. NMIA has been participating in a number of technical Preliminary Work Items organised by ISO TC 229 JWG2 relating to the use of transmission electron microscopy (TEM) for the determination of primary particle size of nanomaterials with size distributions of varying complexity. The aim of these studies is to develop and standardise a protocol framework for the analysis of particle size distribution by TEM.

In terms of measurement standards for nanotechnology, NMIA has developed a primary standard for dimensional nanoscale measurement, which enables Australian stakeholders to have access to internationally acceptable nanoscale measurements. Furthermore, NMIA has actively participated in providing reference measurements for the first nanoparticle-based certified reference materials produced by the European Union's Joint Research Centre.

NMIA also supports nanotechnology innovation in Australia by working with nanotechnology stakeholders to provide consultation, tailored measurement solutions or education and training.

In biotechnology, NMIA is also active in helping foster innovation within Australia. Dr Coleman gave the example of NMIA working with Diagnostic Technology in collaboration with the University of New South Wales and NMIA, to develop a test kit for the quantitative measurement of toxic cyanobacteria (blue-green algae). The Phytoxigene™ CyanoDTec kit was launched in early 2014 and is enabling the management of drinking water supplies by enabling early, rapid detection of harmful cyanobacteria using a DNA test that targets their toxin genes. Traditional techniques detect toxins already present in the environment. The new gene test provides a monitoring process for both the development and decline of a toxic algae bloom event. NMIA developed the standards to be supplied with the kit that enables the measurements made with the kit to be quantifiable.

Another example of how NMIA supports biotechnology innovation in Australia is work being undertaken to underpin the development of personalized cancer treatments in Australian hospitals. By increasing the sensitivity and accuracy of DNA diagnostics, mutations can be

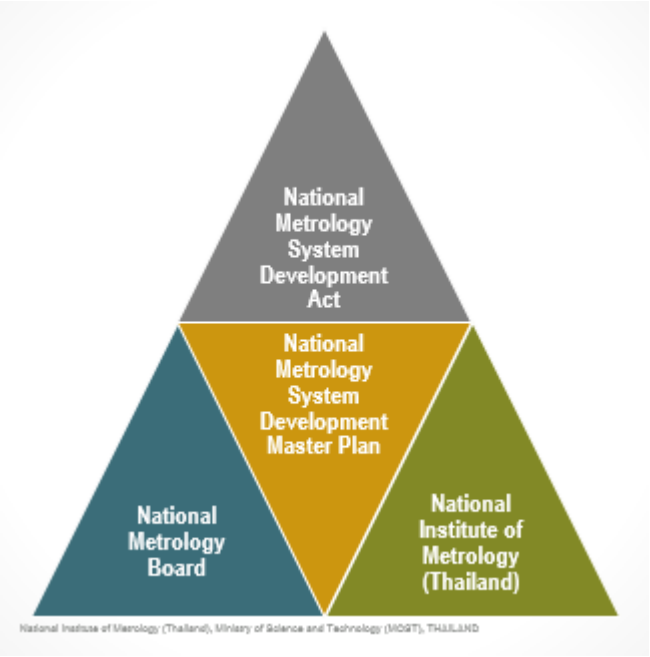
better detected and better screening tests with faster turn-around times can be developed, improving treatment decisions.

Finally, the presentation ended by saying that "to measure is to know more". People making decisions involving technology require measurements that are fit-for purpose, accurate and recognized. This fosters innovation, establishes confidence, reduces uncertainty, and generates an increase of industry competitiveness and market access.

- **Driving Innovative Measurement to Support SME[10] in Thailand**

This presentation was given by Dr Sivinee Sawatdiaree, Head of International Relations officer of the National Institute of Metrology in Thailand (NIMT).

The presentation started with some background information from the NIMT. It was founded during severe economic crisis in 1998. The following pyramid shows the organization and governance of metrology system in Thailand:



The Scientific Metrology and Legal Metrology are still separated under different ministries.

Dr Sawatdiaree, mentioned that it is important to enhance current industries to continue the growth. Additionally, to develop future industries to achieve the leap growth such as: robotics, aviation and logistics, biofuels and biochemical, digital and medical hub.

This means that a National Quality Infrastructure reform is needed. The benefits of a reform could bring improvement of coordination that would yield greater efficiency and lesser

duplications, faster development with clearer direction and better alignment with national strategy and plans, and quicker responds to needs. Lastly, to become more visible.

The link of national metrology development to national economy and social development will create tangible impacts.

Regarding, how NIMT could support SMEs, it was explained that NIMT has good measurement standards and scientists with advanced measurement skills. They utilize what already have, young and enthusiastic scientists and their expertise, and encourage scientists to help and work with SMEs, start from small projects to test the idea and learn from doing it, because starting from big project is not so useful due to the probability to fail is high. In addition, it is required to have collaboration among partners to see and understand roles of other people.

Dr Sawatdiaree gave great examples of how NIMT helped SME to solve problems presented with measurement machines such as: dial gauge tester, flatness tester, among others.

Another example given was the accurate temperature measurement. NIMT went to two companies. One is a small ice cream factory and the other is a fruit exporter, which is bigger than the first one- NIMT staff would like to know if NIMT could help them to save some money by making the temperature measurement correctly. Because they do not believe in the temperature, they saw in the thermometer. Therefore, if they want to keep the ice cream at the -24°C, which is the temperature, they need, but they didn't believe that they already reached that, so they keep it cooler than that. Consequently, they have to pay extra money for the energy. In this sense, NIMT convinced them that NIMT could help them to change what needs to be changed, such as the thermometer and so on. Then SME could trust the number that they see in the thermomether. NIMT could convince them to help setting up the thermometers, how to keep the temperature stable and so on. After some time, NIMT could prove that the small ice cream factory could save energy about 21%. Moreover, the bigger one, the fruit exporter, could save energy up to 27%. As a lesson learned from this experience, if SME do the measurement correctly they could save money and use it for other things and that will make SME more competitive.

What needs to be done is to reach out to more SMEs, scale up or multiplying factors, attract more scientists, differentiate between SME time scale and scientist time scale, and more government support.

The new goal of Thailand’s metrology development is to move the society towards a quality culture. The prosperity of a nation has many aspects and depends on various issues; metrology can be relevant in all of them.

1.7 Session 6: Case studies on innovation – Part 3: Standards

- **Standardization in Smart City, IoT and Big Data areas**

This presentation was given by Mr Nikita Utkin, Head of corporate development of Russian Venture Company (RVC).

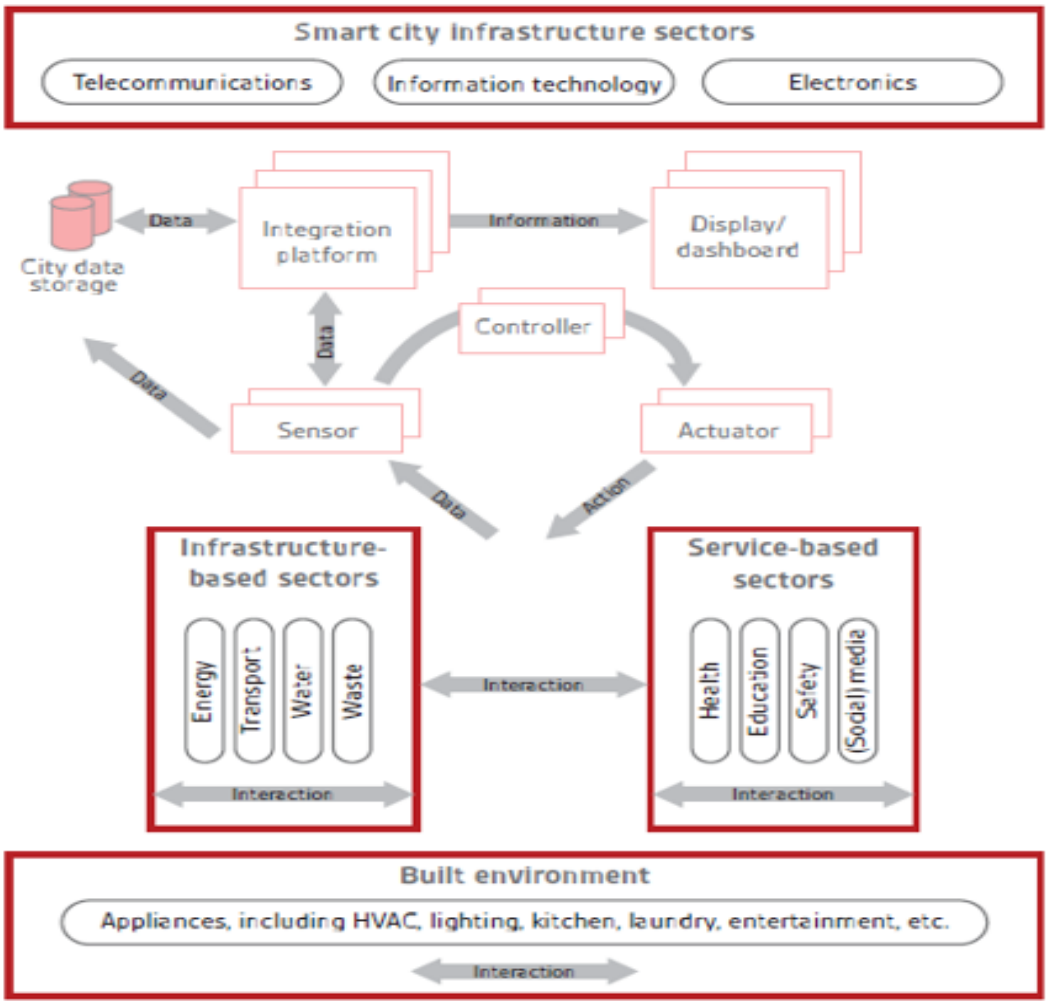
Russian Venture Company (RVC) was established on 7 June 2006 as a government institute aimed to foster development of the venture capital market and innovation environment in Russia. In its role as a development institute, RVC acts as the Government's agent encouraging an effective evolvement of the most critical aspects of social and economic (public) infrastructure and realizing its function through market participation.

RVC scope of activities is in three different areas: Investments (RVC as fund of funds), Institutional (RVC as an institute of innovation development) and technological (RVC as a technology market participant).

All international standards organizations play part of the smart city standards model (ISO, ISO/IEC JTC[16] 1, ITU[17]-T and IEC). There are two stages in the mapping of smart city standards. The first one is the "searching stage" and the second is "making accessible" stage. In stage 1 existing standards related to smart cities are found based on a smart city model. In stage 2, the relevant standards are made accessible to specific stakeholders for specific cases through a search interface.

In the presentation, he showed the smart city model, which show how smart cities work:

[16] JTC: Joint Technical Committee of the International Organization for Standardization (ISO) and the International Electrotechnical Commission (IEC).
[17] ITU: International Telecommunication Union.



Source: BSI Mapping Smart City Standards

Classical model of Smart City is nice and it can see how many elements are integrated with each other, but it is needed to understand in which fields have to work with the new standards, which standards are updated and which standards need to adopt more. There is a great part of infrastructure standards very classical and understandable. At the same time, in new fields especially, the new companies cannot understand what type of standards is better for them right now. Especially, if they try to create a new global business like right now it is used different mobile applications, for example to take a taxi it can easily take it via mobile application. These applications are global and it can be used easily, but actually they have to use the reasonable standards and in each economy, the rules and regulations are very different unless they have to understand the level of standards.

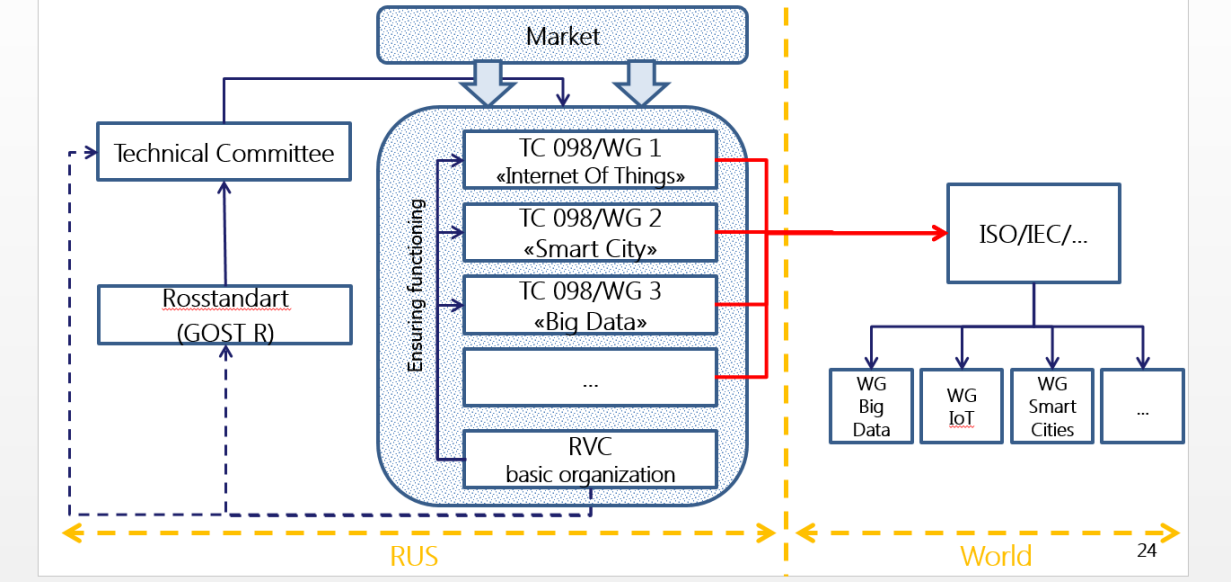
Mr Utkin, shared the international standardization that has been carried out by ISO, ISO/IEC and ITU in the fields of smart cities, internet of things (IoT) and big data area. There are many international standards related standardization activities inside. The working groups ISO/IEC JTC1/WG 11 Smart cities, ISO/IEC JTC 1/WG 9 Big Data and ISO/IEC JTC/WG 10 Internet of

Things are new; and they understood that is important to be in touch with other partners, other groups and technical committees because they have the relevant experience. Anyway, it is a new way of understanding. First of all in the new instruments and services in the Small City level. ISO/IEC/ ISO are a big number of different organizations and they have different opinions of the services on the business development.

At a national level, RVC participates in the Russian Federation Standardization Body, which is cause Rosstandart.

From RVC experience, the intermediate results of the call for Experts procedure has allowed to create a basic pool of the interested experts. There are three working group of experts for: Internet of things, smart cities and big data. All these are mirror committees of international working groups ISO/IEC JTC 1/WG 10, ISO/IEC JTC 1/WG 11 and ISO/IEC JTC 1/WG 9.

The following graph shows how the committees interact with the international working groups:



Finally, Mr Utkin made the following suggestions to the Sub-Committee on Standards and Conformance:

- To organise "Information technology Cooperation Forum" / «Smart Systems Cooperation Forum» that will be focused on reducing trade barriers and enhancing regulatory and standards harmonization for information and smart technologies trade across the APEC region.
- To create internal working group on standardization in information and smart technologies.

- To launch pilot projects in the sphere of Smart Systems (incl. IoT, smart devices, big data and others) with collaboration of different members from the APEC region.

- **Standards and Innovation – Standards as an enabler**

Mr Adrian O'Connell, Deputy CEO of Standards Australia, gave this presentation. He introduced briefly his institution, which is a private industry based body; recognized by the government of Australia as the National Standards Body, so they are a member of ISO and IEC.

Mr O'Connell explained to the audience that in Australia, they had a discussion about, what is the relationship between standards and innovation?. Does a standard inhibit innovation or is an enabler or accelerator of innovation?. The result of this discussion was that there is a relationship between standards and innovation, which is complex, it is not straight full and there is a whole range affecting the relationship. Therefore, if the standards are properly aligned to the right stage of innovation process, the impact is positive. The other issue that is very important to take into account is how the National Standards Body (NSB) itselves operates the standards development process. NSB have to be sure to include all the relevant interesting parties? This is an effective well-run process because you cannot have standards that do not actually have the relevant stakeholders due to the process will not be completed.

In addition, he talked about innovation language, which is interchangeable with invention, so invention is really the first occurrence of an idea, when innovation is the first commercialization of an idea. The inclusion of the invention into reality and into the micro place, the new big ways of doing things trying to apply in life, there is where standards play a role making that invention an effective and in one word consistency.

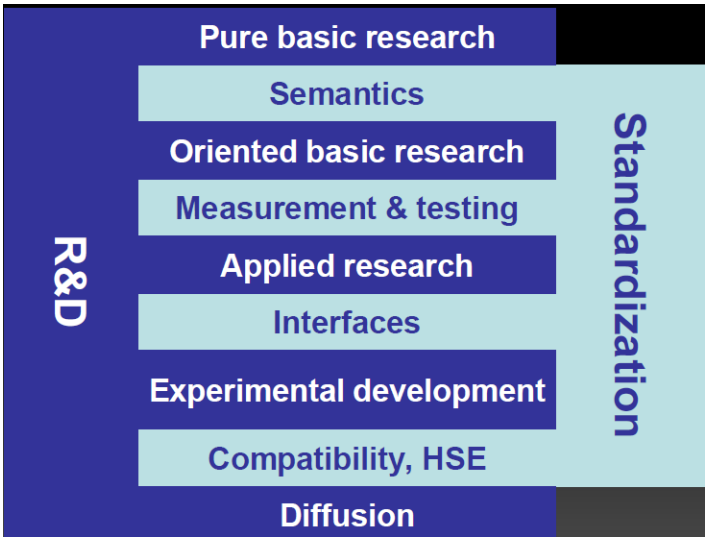
Innovation has a number of features and it is always a change of current situation and has to embrace by potential users. There are many good innovations, that are good ideas and they do not go anywhere. The outcome has to have value in increase profits, prove efficiency, or work well for a community. Innovation takes some various formats, for example, the smartphones had been invented, but there is a constant innovation incrementally.

Today, people talk about new products and new methods of production. In this context, standards are the main focus because is innovation in terms of sources of supply, new markets and new ways to organize businesses arguably, that is the greatest impact in productivity and effectiveness. Industries in the last centuries are organized in a completely different basis.

What is important in standards of innovations is the alignment of the right standards solution at the right phase of the innovation process, so understanding that source of the lifecycle is

important. There are many factors affecting innovation in an economy such as industry estructure, the availability of finance and venture capital, the knowledge and skills, among others. However, if the economy have not the capability to develop, utilize and spread the innovation, it would have a struggle. Having an open and entrepreneur culture has been a very good sign to success an innovation. In addition, there is a government policy and standards. It is the interaction of all these factors, which come the innovation outcome. In this sense, it is important to recognize that standards is just one element in the innovation eco system and the impact of different standards can enable, support or accelerate innovation.

Also, was described the phases of innovation. The first phase is research, which brings stakeholders together and start up enablers such as common vocabulary or terminology, measurements and usage, early guidance as safe handling. The following graph illustrates the role of standards in the research:



Source: Knut Blind (Chair of Innovation Economics, Technical University of Berlin, Germany and Head of the research group "Public Innovation" at Fraunhofer FOKUS, Berlin, Germany)

The next stage can be describe as the technology development phase, which involves develop a community view and establishing competitive readiness, ground work in a system reference architecture, interoperability profiles, early test methods as examples. Then, the next phase is market readiness and acceptance, means to create eco system and conditions for market entry, establishing the supply chain and meeting regulatory requirements.

The last one is business sustainility phase. If a business come up with a new idea or it is making money about it or if it is a potential profitable, it is desirable to sustain it and apply standards of management systems.

Mr O'Conell shared great case studies with standards in innovation, which are solving a particular problem. For example, in the energy storage standard the problem was the lack of current agreement on safe domestic battery installation practices; so a new standard was developed on installation and safety requirements of battery energy systems. This enable people to use batteries as new source of energy in their home, which is increasing uptake. Another case study is industry 4.0, this is an example with advance manufacturing. Standards are critical to the deployment and effectiveness of Industry 4.0 initiatives.

Regarding, what Standards Bodies can do to support innovation across APEC, he recommended first, to provide services and solutions to stakeholders, but also to have a good knowledge of the market and the newest technological innovations. National Standards Bodies have to engage with industry and with the latest trends. It is necessary to establish forums and processes to help innovators and industry converge on needs and priorities at early stage, which will allow educate everyone about standardization.

In conclusion, standards and innovation are very uniquely interrelated. It is complex it is not straight full. There are many other effecters, which can change the equation. Secondly and the most important, if standardization is correctly aligned with the innovation process is a key enabler.

- **Standards and R&D**[12]

The final presentation was given by the General Director of the Bureau of Standards Policy from Korean Agency for Technology and Standards (KATS), Dr Byung Goo Kang. His presentation was about standards and R&D.

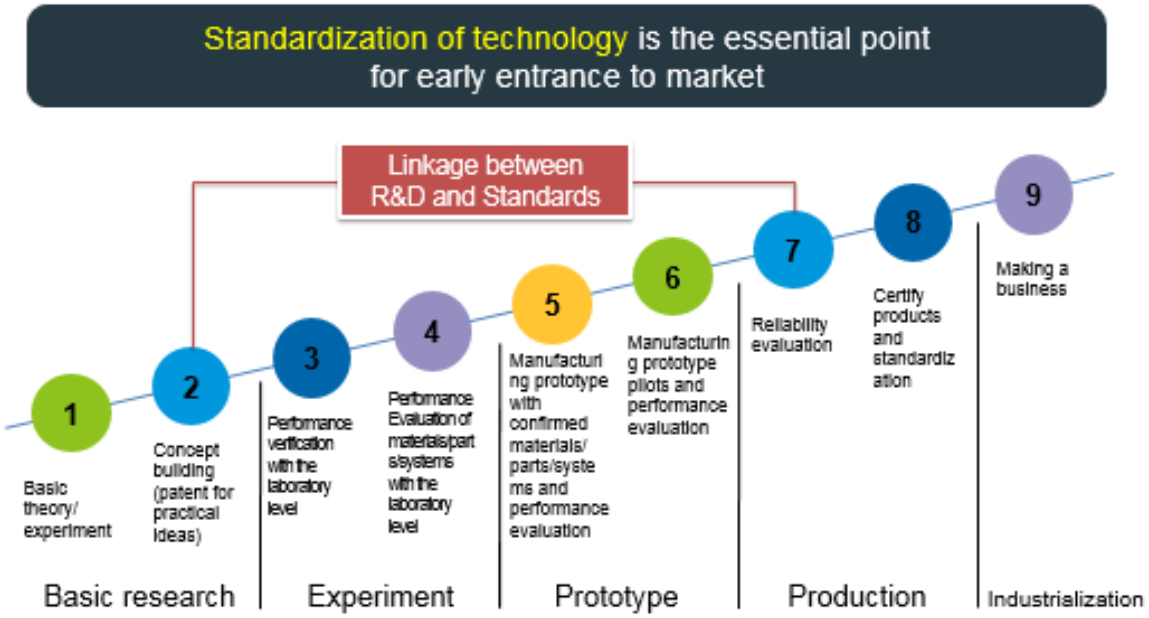
He started the presentation with the definition of standards, which are an agreed way of doing something the same way each time. It brings compatibility, simplification, quality improvement and information delivery. Standards have different roles: Technology dissemination, improvement of business competitiveness and trade facilitation.

Standards are important because these integrate markets by the elimination of trade barriers, integration of regional markets through regional Free Trade Agreements, and acceleration of network economy by IT[11] development.
Standards and Innovation are closely related. These codify and spread the state of the art in various technologies. Additionally, these facilitate the introduction of innovative products by providing interoperability between new and existing products. Gain market acceptance if they comply with existing standards for safety, quality and performance, and can help to bridge the gap between research and marketable products or services.

There is a necessity to link between R&D and standards. These in order to:

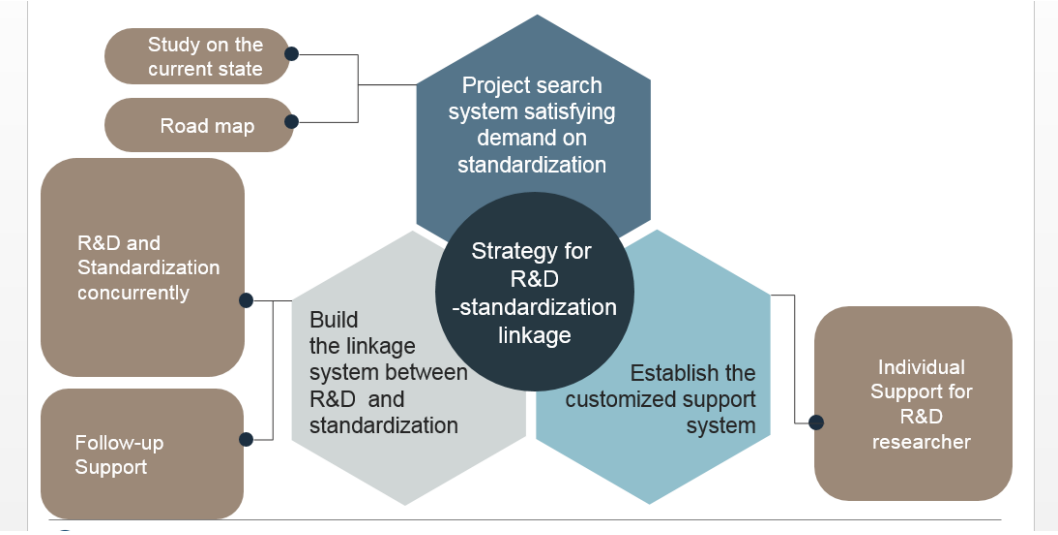
- Contribute to promote R&D process effectively: Application of interface standards not only enhances the accessibility to market but also helps set up the direction of technology development.
- Prepare for the trend of technology: If promoting standardization after R&D, difficult to deal with the rapidly changing environment of technology such as convergence and new technology in time.
- Use as a tool for disseminating R&D results: Since standardization ensures the common use of technology, it promotes technology to be a business. The patent of technology is protected by essential patent or is compensated by revenue from complementary goods.

Standardization of technology is the essential point for early entrance to the market. This is shown in the following graph of where R&D and standardization should be linked.



R&D projects in new emerging industries and standardization policy in Korea was also mentioned. The Ministry of Trade Industrial and Energy (MOTIE) in Korea selected newly emerging industries and tries to support R&D of related technologies, and also MOTIE requested to the researchers to incorporate standardization with all the R&D projects for the newly emerging industries.

How we link those R&D proposals and standardization is shown in the following graph:



In the center of the graph above is a "Strategy for R&D", but actually is a system for the standardization linkage. There is a research of proper standardization, which satisfies the demand of the market; these must be realized by the studies on the current state of standardization of technology area. Actually, there is a corporative organization for standards development in Korea. The coordinator is in charge of studying this case of standardization. Then, KATS supports the follow-up standardization activities. When those researchers are not familiar with the standardization activities, KATS provides individual support to these researchers. So, when the researchers are proposing their ideas to MOTIE, they are asked to make a review of the availability of standardization in the project plans. As a part of the assessment, the evaluation of the standardization activity is very important. The researcher put much attention to the standardization of the activity while they are persuading the project.

The standardization projects in Korea as a part of R&D have the purpose to develop standards and standardization in the field of convergence and integration technology, to reinforce capability for national standardization and to promote standards infrastructure. These act under the legal basis on the promotion of technology, the Framework Act on National Standards and the Industrial Standardization.
Dr Kang introduced two types of projects that MOTIE is doing. The first one has more than twenty years and this initiative started from the 1995 and it is still going on, this is the standardization process from New Work Item Proposal (NWIP) to International Standard (IS). The proposal of this initiative is to develop international standards in the field of technologies. The support of the project amount up to 0,2 million USD a year within 4 years of project period as it takes 3-4 years from New Work Item Proposal (NWIP) to International Standard (IS) generally.

The other initiative is the establishment of standardization infrastructure; its purpose is establishing infrastructure such as policy development for standardization rather than standards development. In order to build standardization infrastructure within a short period, support the project amount up to 0,4 million USD a year within 3 years.

The main fields of standardization projects are:

- To establish standardization policies and strategies through research and analysis on technology and market trend,
- to establish a systems to link international standardization of original technology to business,
- to promote the competence of standardization in the private sector,
- to creates a system for training experts and
- standardization education.

In conclusion, international standardization of technology is important for global competitiveness of companies. It is necessary to link R&D and standards.

2. Surveys analysis

In the framework of the 11th Conference on Standards and Conformance two surveys post conference were issued: Conference survey and post-conference survey.

2.1 Conference survey

A conference survey was distributed among speakers and participants in order to measure the satisfactory level from the 11th Conference on Standards and Conformance and to get feedback from the audience. Also, if gender issues were arised appropriately was asked in the conference survey.
In general terms, the aspects covered by this survey were:

- To assess qualitative perspective from participants regarding to the development of the conference.
- To know if participants learnt or gained some knowledge in the Conference
- To identify what actions will be done by participants in their own economies and what APEC SCSC should do as next step.

The results of the Conference survey are shown in the Appendix 3. In this survey, identification information from participants was optional. It was received replies from 60 participants out of 100 participants that attended to the conference. Based on the results obtained, it is important to highlight:

a) Over 90 % of respondents agree and/or strongly agree that: objectives were clearly defined, the conference achieved its intended objectives, agenda items and topics were relevant and that content was well organized and easy to follow. In the same line, 92% of respondants considered the conference mostly and/or very relevant to their economies. So, this figures show that the conference development responded to the participants' expectatives and was important for their economies.
b) However, there were some interesting comments for future conference such as to make incidence in policies that allow trade, when talking about technical regulations and to show case studies where performing conformity assessment depending on the risk of the product at stake. Another recommendation was to be focus on specific sectors on Standards and Conformance in order to share more economies' experiences and best practices in the development of their standards; also, it was requested to include other fields such as medicines. In addition, it was requested more summaries every session and panel discussion so it would be easier for the audience to understand the speakers' main ideas. Regarding, new topics to be addressed it was requested international standardization topics and innovation in co-validation of international quality certificates.
c) 88 % of the respondants agree and/or strongly agree that gender issues were sufficiently addressed during implementation.
d) Conference survey respondants acknowledged of the speakers and moderators' high level. In this sense, 100 % agree and/or strongly agree that; the speakers and moderators were well prepared and knowledgable about their topics and the materials distributed were useful.
e) Even 95% of the respondants agree or strongly agree that time allotted for training was enough, comments from participants stated that there were many important topics and have more time would be important because is necessary to deep on technical training.
f) Regarding, the conference's achievements, participants expressed that they could get experiences from different economies and more theoretical reasons that evidence that innovation development can be achieved through quality infrastructure implementation which includes standardization, metrology, conformity assessment and accreditation. Also, it was promoted a quality culture recognizing the importance of innovation and the standards in the contribution to the economic growth.
g) 87 % of participants affirmed that increased high or very high their knowledge and skills after participating in the conference. Regarding, new skills and knowledge gained

participants recognized that it was fruitful to know different experiences from economies in the field of innovation and how standardization, metrology and conformity assessment impact positively innovation. In addition, the conference gave to participants an overview of innovation technologies developed from economies, the importance of develop quality infrastructure as an important key to improve the flow trade and the economy growth.

h) Regarding what actions participants will do in their economies; the proposals were develop: trainings, new initiatives of policies, strategies, projects and work plans related to the importance of standards and conformance in the field of innovation.

2.2 Post Conference survey

A post conference survey was circulated among conference participants in order to know: if the conference' experiences where clear enough to promote their implementation, their commitment and intention to implement within their own economy any initiative learnt in the conference and their intention to disseminate the project outputs to stakeholders within their own economy. In addition, recommendations regarding initiatives and future actions that APEC could take into account for promoting the use of standards innovation, including conformity assessment and metrology, were considered.

The post conference survey has three parts:

- Part A Contact detail
- Part B: Conference content
- Part C: Future steps

The total number of respondants was 25 out of 100 participants from 14 economies. The respondants belongs to Sub-Committee on Standards and Conformance, Food Safety Cooperation Forum, Small and Medium Enterprises Working Group. The results of this survey are in the Appendix 4.

From the replies received, it is important to highlight:

a) The majority of participants consider that the conference content and materials were useful and clear.

b) Regarding actions than participants have done or planning to do the principal action prioritized is to share information with and/or stakeholders, followed by to use information exchange for bilateral projects or initiatives and to apply in their economies any initiative learnt.
c) In the same line, participants were asked for future steps and initiatives that SCSC[3] should take into account for promoting the use of standards innovation, which includes conformity assessment and metrology. Interesting proposals were received such as: Using IT[11] system to promote the innovation, make cross-economies studies; make more conferences in this topic applied in specific sectors, to make awareness of government agencies in order to create government policies that promote the use of standards in all economic sectors, to emphasize the importance of standards and innovation to support micro, small and medium enterprises and the role of science and technology, among others.

3. Conclusions

- The 11th Conference on Standards and Conformance, allowed to share experiences among APEC economies regarding to how standards, metrology and conformity assessment improve innovation projects and policies. There were high-level speakers belonging to 12 economies, as well as Specialist Regional Bodies (APLAC[6] and APMP[7]), International Organization (IEC[1]) and PTB[2] as a guest. All the speakers explained their initiatives and policies, which supported them to develop quality infrastructure in innovation programs and projects. This conference had a great reception from APEC economies who considered important to attend this Conference. As a result, 100 participants from 19 economies participated in the Conference who increased their capacity building on standards as innovation driver, including conformity assessment and metrology.
- APEC has been doing efforts to link and promote innovation through standards, conformance and metrology, as was explained by PPSTI[5], APMP[7] and APLAC[6].
- From Japan; Mexico and the United States presentations could be concluded that innovation policies are helpful to motivate innovation projects but if there is not a stakeholder involvement and an adequate communication strategy, these policies cannot be applied efficiently.
- Quality Infrastructure has a positive impact on innovation programs and projects. It could be present in all the stages but the impact will be different depending on the stage that quality infrastructure takes part on the innovation project. Through presentations in the 11th Conference, it is recognized that commercialization stage is

the most important stage where standards need to be applied to an innovation project or program.

- From survey replies, can be concluded that participants realized that the 11th Conference helped to make clear the concept of standards innovation, and the positive impact that standards could play on an innovation program/project. On the other hand, it was addressed that standards contribute in the economic growth (as explained by Canada) and promote trade facilitation among APEC economies.
- In the 11th Conference, different experiences were shared of different kind of technologies. Russia Federation and Australia shared successful experiences applied in advance technologies. On the other hand, experiences shared from Indonesia; Peru; the Philippines and IEC proved that innovation is not exclusive from high technologies. In addition, Thailand experience explained how SMEs could apply innovation into their processes through metrology as a tool to improve their competitiveness.
- Australia and PTB's presentations stated that standards contribute positively to innovation programs, nevertheless, is only one key factor but not the only one, because there are other factors, which needs to take into account during the development of innovation program and project.

4. Reccomendations to Sub-Committee on Standards and Conformance

- To continue sharing experiences regarding quality infrastructure support to innovation in specific fields, so that economies can exchange practical examples in their area of interest.
- To conduct case studies of good practices in which standards and conformance support innovation together with evaluation of economic impact of such standards on innovation.
- To develop communication plans in order to adequately involve and engage stakeholders in this kind of projects.

APPENDIX 1 – AGENDA

Committee on Trade and Investment
Sub-Committee on Standards and Conformance
Agenda
11th Conference on Standards and Conformance

Day 1: 18 August 2016

8:00 h – 9:00 h	Registration
9:00 h – 9:10 h	Welcoming remarks Mrs Rocío Barrios, SCSC Chair, Executive President of National Institute of Quality (INACAL), Peru
9:10 h – 9:20 h	Official photo
9:20 h – 9:30 h	Business arrangements

Opening session

9:30 h – 10:00 h	APEC survey on Standards Innovation Mrs Soraya Lastra – Project Overseer of CTI 20 2015T – 11th Conference on Standards and Conformance
10:00 h – 10:30 h	Are Standards Innovation Drivers? Dr Alexis Valqui - Physikalisch-Technische Bundesanstalt (PTB)
10:30 h – 11:00 h	Driving Innovation through Standardization Mr Stephen Head - Manager, Strategic Policy and Sector Engagement - Standards Council of Canada Canada
11:00 h - 11:10 h	Q & A session
11:10 h – 11:40 h	**Coffee break**

Session 1: APEC Approach on Innovation related to standards, conformity assessment and metrology

Moderator: Kent Shigetomi - Director for Multilateral Non-Tariff Barriers - Office of the United States Trade Representative (USTR) – USA

11:40 h – 12:10 h	Policy Partnership on Science, Technology and Innovation Mr Ma Leju – PPSTI Chair's representative
12:10 h - 12:40 h	APMP's strategy to foster and support innovation by strengthening measurement capabilities within the Asia Pacific Dr Victoria Coleman – APMP representative
12:40 h – 13:10 h	Accreditation and Conformity Assessment. Assisting Regulators and Specifiers Mr Wong Wang Wah - APLAC Chair
13:10 h – 13:20 h	Q & A session
13:20 h – 13:30 h	Conclusions of Session 1 – Moderator

13:30 h – 14:30 Lunch

Session 2: Discussion Policy on Innovation

Moderator: Mr Vimal Mahendru – IEC Ambassador

14:30 h – 15:00 h	Supporting Development of Standards in the Area of Cutting-edge Technology Mr Mitsuo Matsumoto - Director, Office for Economic Partnership for Standards and Conformity Assessment – Ministry of Economy, Trade and Industry Japan
15:00 h – 15:30 h	Mexico´s Program of Innovative Development for 2013-2018 (PRODEINN) Mr Bernardo Alejandro Estrada Samaniego – Planning Director – Ministry of Economy Mexico

15:30 h – 15:40 h	Q & A session
15:40 h – 16:10 h	**Coffee break**
16:10 h – 16:40 h	Strategy for American Innovation Mr Kent Shigetomi - Director for Multilateral Non-Tariff Barriers - Office of the United States Trade Representative (USTR) USA
16:40 h – 17:10 h	Increasing competitiveness in companies through innovation projects cofinancing and Quality Management Systems certifications Mr Erich Inguil – Executive – National Program of Innovation for Competitively and Productivity Peru
17:10 h – 17:20 h	Q & A session
17:20 h – 17:30 h	Conclusions of Session 2 – Moderator
17:30 h – 17:40 h	**Conclusions of Day 1**

Day 2: 19 August 2016

8:00 h – 9:00 h	Registration
9:00 h – 9:10 h	Review of the first day and next steps Mrs Soraya Lastra – Project Overseer of CTI 20 2015T – 11th Conference on Standards and Conformance

Session 3: Accreditation supporting Innovation

Moderator:	Mr Wong Wang Wah - APLAC Chair
9:10 h – 9:40 h	Innovation on Accreditation - reducing regulatory burden Mr Roslan Alias - Senior Principal Assistant Director - Accreditation Division - Department of Standards Malaysia Malaysia

9:40 h – 10:10 h	Accreditation of Innovative Technologies for Housing Eng. Jovita G. Panopio– Secretariat Head of Accreditation of Innovative Technologies for Housing (AITECH) – National Housing Authority the Philippines
10:40 h – 10:50 h	Q & A session
10:50 h – 11:00 h	Conclusions of Session 3 – Moderator
11:00 h – 11:30 h	**Coffee break**

Session 4: Case studies on innovation – Part 1: Energy and Electro technical Sector

Moderator: Mr Mitsuo Matsumoto - Director, Office for Economic Partnership for Standards and Conformity Assessment – Ministry of Economy, Trade and Industry – Japan

11:30 h -12:00 h	Electricity access for all: IEC International Standards for inclusive development Mr Vimal Mahendru - Convener of the IEC Systems Evaluation Group 4 (SEG4) for Low Voltage Direct Current Applications – IEC Ambassador
12:00 h – 12:30 h	Gasoline to LPG converter kit for small fishing boat engine Mr Donny Purnomo - Acting Director of Accreditation of Certification Body - National Standardization Agency of Indonesia (BSN) Indonesia
12:30 h – 13:00 h	Importance of the lab tests and standards in the development and innovation of technical products Eng. Wilber Aragonéz – President of Directive Council - Productive Innovation and Technological Transfer Center (CITE) Energy Peru
13:00 h – 13:10 h	Q & A session
13:10 h – 13:20 h	Conclusions of Session 4 – Moderator

13:20 h – 14:50 h **Lunch**

Session 5: Case studies on innovation – Part 2: Metrology

Moderator: Eng. José Dajes – Director – Directorate of Metrology – National Institute of Quality (INACAL) - Peru

14:50 h – 15:20 h	The role of nano- and bio-measurement in support of innovation in Australia Dr Victoria Coleman, Project Leader and Acting Section Manager, Nanometrology Australia
15:20 h – 15:50 h	Driving Innovative Measurement to Support SME in Thailand Dr Sivinee Sawatdiaree, Head of International Relations Officer from the National Institute of Metrology Thailand
15:50 h – 16:00 h	Q & A session
16:00 h – 16:10 h	Conclusion of Session 5 – Moderator
16:10 h – 16:40 h	Coffee break

Session 6: Case studies on innovation – Part 3: Standards

Moderator: Mrs Rosario Uría – Director of Standardization Directorate – National Institute of Quality (INACAL) - Peru

16:40 h - 17:10 h	Standardization in Smart City, IoT and Big Data areas Mr Nikita Utkin, Head of corporate development, Russian Venture Company Russia
17:10 h – 17:40 h	Standards and Innovation – Standards as an enabler Mr Adrian O´Connell – Deputy CEO – Standards Australia Australia
17:40 h – 18:10 h	Standards and R & D

	Dr Byung-Goo Kang- Director General for the Bureau of Standard Policy - Korean Agency for Technology and Standards Republic of Korea
18:10 h – 18:20 h	Q & A session
18:20 h – 18:30 h	Conclusions of Session 6 – Moderator
18:30 h – 18:40 h	**Conclusions of Conference**

APPENDIX 2 – SPEAKERS

CTI 20 2015T – 11th Conference on Standards and Conformance – Project on Standards Innovation

This Appendix contains the speakers' biography in order of appearance in the agenda

- Dr Alexis Valqui

  Dr Alexis Valqui is the Head of the working group "Technical Cooperation in Latin America and the Caribbean", Physikalisch-Technische Bundesanstalt (PTB) in Germany which is the National Metrology Institute of the Federal Republic of Germany. He works on Defining and implementing the policy and strategy of the working group regarding Quality Infrastructure (metrology, standardization, conformity assessment and accreditation) projects in Latin America and the Caribbean. Dr Alexis Valqui is an expert on quality infrastructure issues, development policy, agriculture development, trade issues and especially on Economic Partnership Agreements. Dr Alexis Valqui is an Advisor to the Presidency of Inacal on the implementation of this new institution, which comprises the areas of Standardization, Accreditation, Metrology as well as fourth division for the "Strategic Development of Quality" in Peru.

- Mr Stephen Head

  Mr Stephen Head is the Manager of Strategic Policy and Sector Engagement, in the Strategy and Stakeholder Engagement Branch of the Standards Council of Canada (SCC). His current responsibilities for the SCC include monitoring the files of the World Trade Organization Technical Barriers to Trade Committee, the APEC Sub-Committee on Standards and Conformance, SCC's input to the standardization components of Canada's various Free Trade Agreements and regulatory cooperation. Mr Head provides policy advice and analysis on the international, national and regional implications of a broad range of regulatory, trade and standardization policies, initiatives, programs and practices.

- Mr Ma Leju

  Mr Ma Leju is the PPSTI[5] Chairman Office in China. He is a Project Manager at China Science and Technology Exchange Center. With a Diplomat at Chinese Embassy in Italy. Attache', Third Secretary, Second Secretary in Science Office of Bilateral Innovation Cooperation China-Italy and Bilateral Cooperation in Space, Environment and Energy. Mr Ma Leju was a Project Officer at Ministry of Science and Technology of Central and Eastern Europe Affairs in Bilateral STI Cooperation with CEE countries.

- Dr Victoria Coleman

  Dr Victoria Coleman is the Project Leader and Acting Section Manager of the National Measurement Institute of Australia (NMIA). She leads the Nanometrology Section at NMIA, and Australia's peak body for physical, chemical, biological and legal metrology (measurement science). Dr Coleman is Chair-Elect of the Asia Pacific Metrology Programme (APMP)'s Technical Committee for Material Metrology (TCMM) and holds a PhD in Materials Physics from the Australian National University in Canberra.

- Mr Wong Wang Wah

  Mr Wong Wang Wah is the Executive Administrator of Hong Kong Accreditation Service (HKAS) and Product Standards Information Bureau (PSIB). Mr Wong received his BSc (Hons) in Chemistry and MSc in Environmental Management from the University of Hong Kong, and his MSc in Food Science from the University of Reading, United Kingdom. He is the Chairman of the Asia Pacific Laboratory Accreditation Cooperation (APLAC) and a member of the Executive Committee of the International Laboratory Accreditation Cooperation (ILAC). He is the delegate of Hong Kong, China to APEC SCSC[3], International Organization for Standardization (ISO), Pacific Area Standards Congress (PASC), ILAC, International Accreditation Forum (IAF), and Pacific Accreditation Cooperation (PAC).

- Mr Mitsuo Matsumoto.

  Mr Mitsuo Matsumoto is the Director of the Office for Economic Partnership for Standards and Conformity Assessment of the Ministry of Economy, Trade and Industry in Japan. Deputy Secretary-General of International Cooperation, Japanese Industrial Standards Committee (JISC) Industrial Science and Technology Policy and Environment Bureau from Ministry of Economy, Trade and Industry (METI). Mr Matsumoto has made his career in METI in the field of industrial standardization, quality control and conformity assessment, Research & Development projects for industrial technologies, natural resources and energy policy, commerce and information policy as well as international cooperation activities in these fields. He has been also participating in international/regional meetings such as ISO/IEC, Organisation for Economic Co-operation and Development (OECD), ASEAN-METI dialogue, Asia-Europe Meeting (ASEM) and APEC as a head of Japanese delegation.

- Mr Bernardo Alejandro Estrada Samaniego

  Mr Bernardo Estrada is the Planning Director of the Secretary of Economy in Mexico. He is in charge of revising the accomplishment of the programs for the Economic sector

derived from the National Plan for Development 2013 – 2018 in Mexico. Licensed in Business Administration and Master in Public Administration from the University of Valle of Mexico. He has specialization studies in matters of Commercial Policy, Customs Law and Strategic Planning in the Government Entities. He participated in diverse seminars and trainings given by organizations such as the Interamerican Bank of Development, the World Trade Organization and the Integration Association of Latin America.

- Mr Kent Shigetomi

  Mr Kent Shigetomi serves as the Director for Multilateral Non-Tariff Barriers of the United States Trade Representative (USTR) Office. Mr Kent Shigetomi is the U.S. lead to the APEC Sub-Committee on Standards and Conformance. He also works on issues related to rules of origin and development.

- Mr Erich Inguil

  Mr Erich Inguil is the Executive of the National Program of Innovation for competitively and productivity (Innovate Peru). Mr Inguil is a biologist with 10 years' experience in projects of applied research and innovation, with advanced expertise in project management and quality (PMI), in management systems ISO 17025 laboratories, in formulation and management of innovation projects, and graduate studies in plant breeding.

- Mr Roslan Alias

  Mr Roslan Alias is Senior Principal Assistant Director from Accreditation Division, Department of Standards Malaysia. Professional Experience as a Scheme Manager for Malaysia Inspection Bodies Accreditation Scheme (MIBAS), Lead Assessor for MIBAS and Malaysia Laboratory Accreditation Scheme. Also, he is APLAC Evaluator for inspection field.

- Eng. Jovita G. Panopio

  Eng. Jovita G. Panopio has graduated with the degree of Civil Engineering at the Pamantasan Ng Lungsod Ng Maynila. She further enhances her knowledge by taking up B.S Sanitary Engineering. She also has graduated from Business Management and she has graduated of Master in Engineering Management and Master in Business Administration. At present, she is the Division Manager at the Housing Technology Development Office and the Secretariat Head of Accreditation of Innovative Technologies for Housing (AITECH) Inter-Agency Committee, which is responsible for the evaluation of new construction technologies. Eng. Jovita G. Panopio is also the Head

of the Evaluation group responsible for the Technical evaluation of the New Technologies, which were applied for AITECH Accreditation.

- Mr Vimal Mahendru

  Mr Vimal Mahendru is the President of Legrand-India, a subsidiary of the French multi-national Legrand. An engineer with 27 years' experience in manufacturing, supply chain, finance and international business. Mr Mahendru is a prominent member of the Indian electrical equipment industry and he was President of the Indian Electrical and Electronics Manufacturers Association (IEEMA), industry association in 2010-2011. He is on several committees of the Government of India, including the Bureau of Indian Standards, where he chairs the committee for standards development and maintenance for Low Tension (LT) and High Tension (HT) fuses. Mr Mahendru is an elected member of the IEC Standardization Management Board (SMB) for a period of three years and IEC Ambassador. Simultaneously, he is the Convenor of the IEC SEG 4 for LVDC (Low Voltage Direct Current).

- Mr Donny Purnomo

  Mr Donny Purnomo is the Acting Director of Accreditation of Certification Bodies from National Standardization Agency of Indonesia (BSN). Engineering Physics in the Bandung Institute of Technology from Indonesia. Mr Donny Purnomo has an experience as a Manager for Product and Person Certification Body Accreditation and Scientific Officer for Calibration Laboratory Accreditation Centre for Accreditation of Certification Body from the National Standardization Agency of Indonesia. Mr Donny Purnomo has an International experience in the Laboratory Technical Assessor in IEC[1] Conformity Assessment System for Electric and Electronic Equipment (IECEE CB Scheme) and Asia Pacific Laboratory Accreditation Cooperation (APLAC) peer- evaluator for Testing and Calibration.

- Eng. Wilber Aragonéz

  Mr Wilber Aragonéz is the President of Directive Council of Productive Innovation and Technological Transfer Center (CITE) Energy and CEO of Silicon Technology SAC. He actively participates in the management and direction of Silicon Technology SAC from 2001. It is the first Peruvian enterprise for the design and production of high voltage polymer insulators and main manager for the development of silicon coatings and the implementation of ABB electric equipment, promoting the focus of the company in the local and international expansion of the activity, especially in the medium and high voltage sector.

- Dr Sivinee Sawatdiaree

  Dr Sivinee Sawatdiaree is the Head of International Relations Officer from the National Institute of Metrology in Thailand. Dr Sawatdiaree studied science and specialized in theoretical physics. Dr Sawatdiaree has developed skills to formulate policy and recommendation based on her scientific and critical thinking. She has successfully introduced a concept of quality culture into the third National Master Plan on Metrology Development. She drafted a proposal that called for a reform of the infrastructure in Thailand.

- Mr Nikita Utkin

  Mr Nikita Utkin is the Head of corporate development of Russian Venture Company (RVC). Mr Utkin works in the technological sphere with focus on strategic management, investments and business planning since 2008. He has experience of consulting in the sphere of strategy and investments of the Russian innovative companies. He also contributes in standardization, being Governor of groups of national standardization: WG1 on Internet of Things, WG 2 on Smart Cities and WG3 on Big Data (based on TC 098).

- Mr Adrian O'Connell

  Mr Adrian O'Connell is Deputy CEO at Standards Australia. Mr O'Connell has extensive career experience in leading and managing professional service and membership based organizations across a range of private and public sector industries. He has made a proactive and constructive contribution to the work of ISO Technical Management Board (TMB) to support ISO and its members in effectively addressing current and future issues and challenges.

- Mr Byung-Goo Kang

  Mr Byung-Goo Kang is the General Director for the Bureau of Standard Policy, Korean Agency for Technology and Standards (KATS) of Korea. He is Member of ISO Council, Member of the Accreditation system committee, KOLAS (Korea Laboratory Accreditation Scheme) and President of the Research Council for Standards Management. In addition, Mr Byung-Goo Kang is the Chairman of KAB (Korea Accreditation Board) Deliberation Commission.

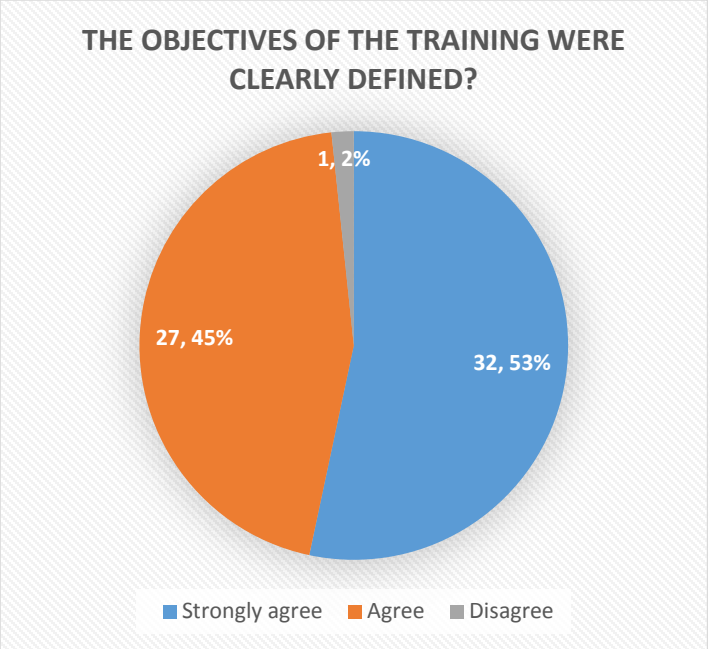
APPENDIX 3 – Conference Survey results

APEC Evaluation Survey: CTI 20 2015T – 11th Conference on Standards and Conformance – Project on Standards Innovation

Date 18 to 19 August 2016

A conference survey was distributed among speakers and participants in order to measure the satisfactory level from the 11th Conference on Standards and Conformance and to get feedback from the audience. Also, if gender issues were arised appropriately was asked in the conference survey. In this survey, identification information from participants was optional. It was received replies from 60 participants out of 100 participants that attended to the conference.

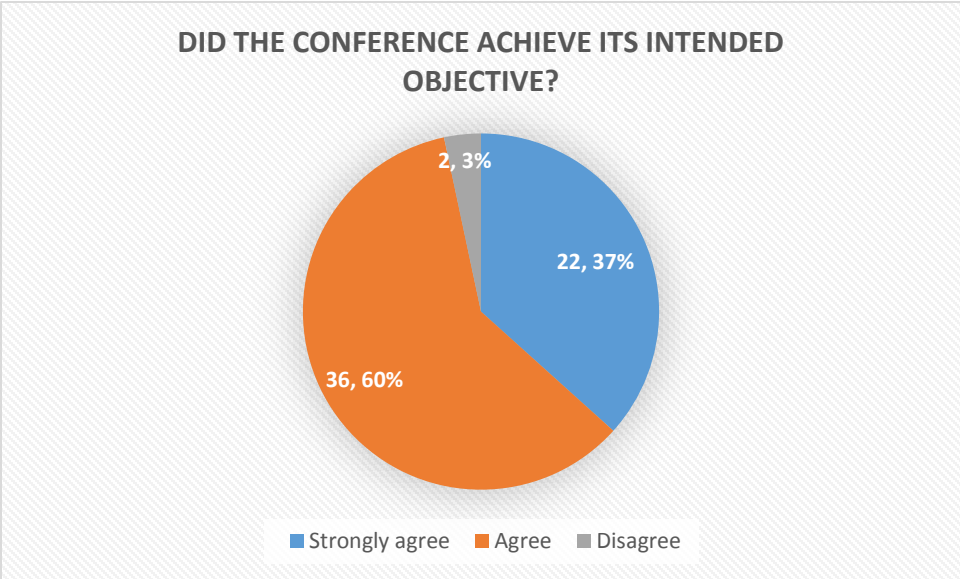
The objectives of the training were clearly defined	Quantity	Percentage
Strongly agree	32	53%
Agree	27	45%
Disagree	1	2%
Total	**60**	**100%**



Comments:

- Incidence in policies that allow trade, when talking about technical regulations (obligatory). Cases of unique windows, equivalent technical regulations (homologation), where performing conformity assessment depending on the risk of the product at stake.
- Yes, however, the topic was too broad and the time to short to cover all areas.
- Maybe it is also best to categorize different fields on Standards and Conformance so that topics and issues will be specific and more sharing of experiences of economies and best practices in the development of their standards.
- Should compare between APEC goals and the Conferences goals so we could knowed the achieved of objectives.
- It was defined in the program.
- I think the presentations were telling the people what they knew already.

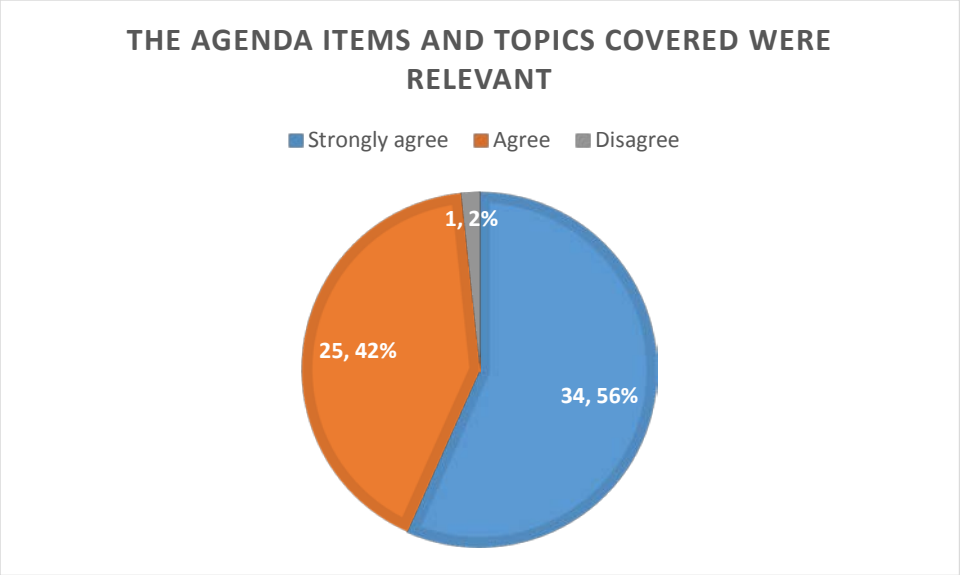
The conference achieved its intended objectives	Quantity	Percentage
Strongly agree	22	37%
Agree	36	60%
Disagree	2	3%
Total	**60**	**100%**



Comments:

- It was a great international level.
- In general yes, but it would be recommended a new event reinforcing some concepts and experiences.
- Need more summaries every session and panel discussion so we can catch the point exactly.

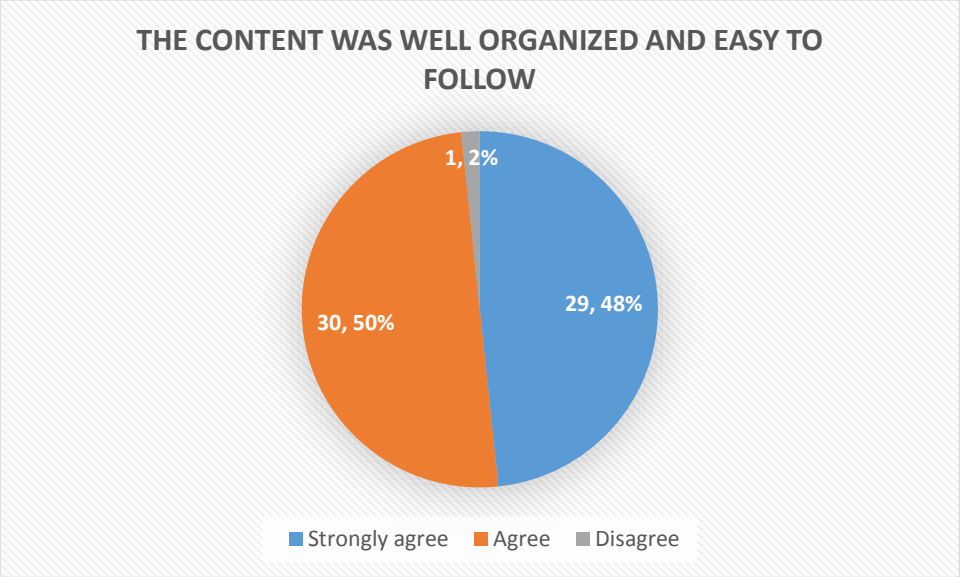
The agenda items and topics covered were relevant	Quantity	Percentage
Strongly agree	34	56%
Agree	25	42%
Disagree	1	2%
Total	**60**	**100%**



Comments:

- It would be interesting for the next meetings to work international standardization topics and innovation in co-validation of international quality certificates.
- A lot, to the point of implementing improvements in our procedures. Yes, these were relevant, because the topics were important.
- In my opinion, it is better to have more presentations about innovation related standards and conformance. Some presentations have only the instruction of funds so, they are far from the standards and conformance.

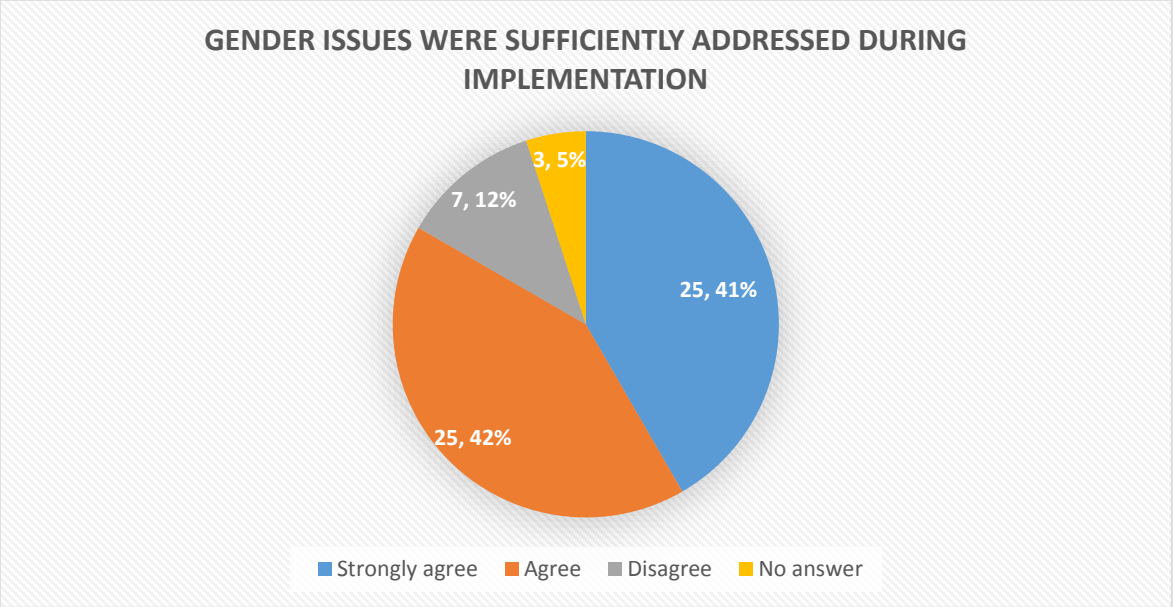
The content was well organized and easy to follow	Quantity	Percentage
Strongly agree	29	48%
Agree	30	50%
Disagree	1	2%
Total	60	100%



Comments:

- There has been lots of content on products such as food or energy manufactury. Is it possible to include medicines?
- It was all excelent. I congratulate you
- The documents helped.
- Arrange the materials based on sequence of presentation based on time schedule

Gender issues were sufficiently addressed during implementation	Quantity	Percentage
Strongly agree	25	41%
Agree	25	42%
Disagree	7	12%
No answer	3	5%
Total	**60**	**100%**



Comments:

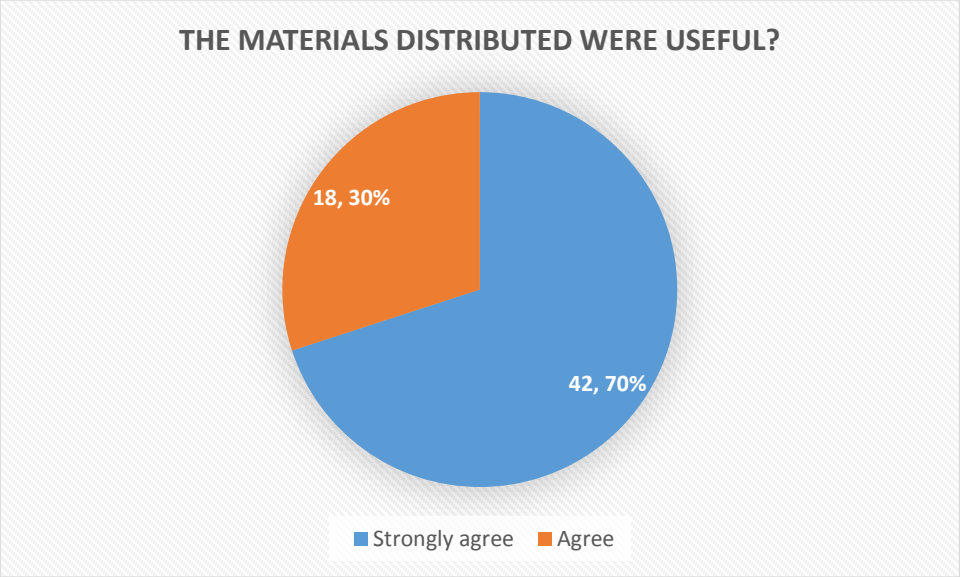
- Affirmative, many doubts appeared.
- Yes, the gender topics were addressed.

The trainers/experts or facilitators were well prepared and knowledgeable about the topic	Quantity	Percentage
Strongly agree	41	68%
Agree	19	32%
Disagree	0	
Total	**60**	**100%**

Comments:

- There should be expositors with more involvement on public policies in their economies and that work on technical regulations.
- Everyone without exception contributed with updated knowledge.
- Yes, everyone knew perfectly the topic being presented.

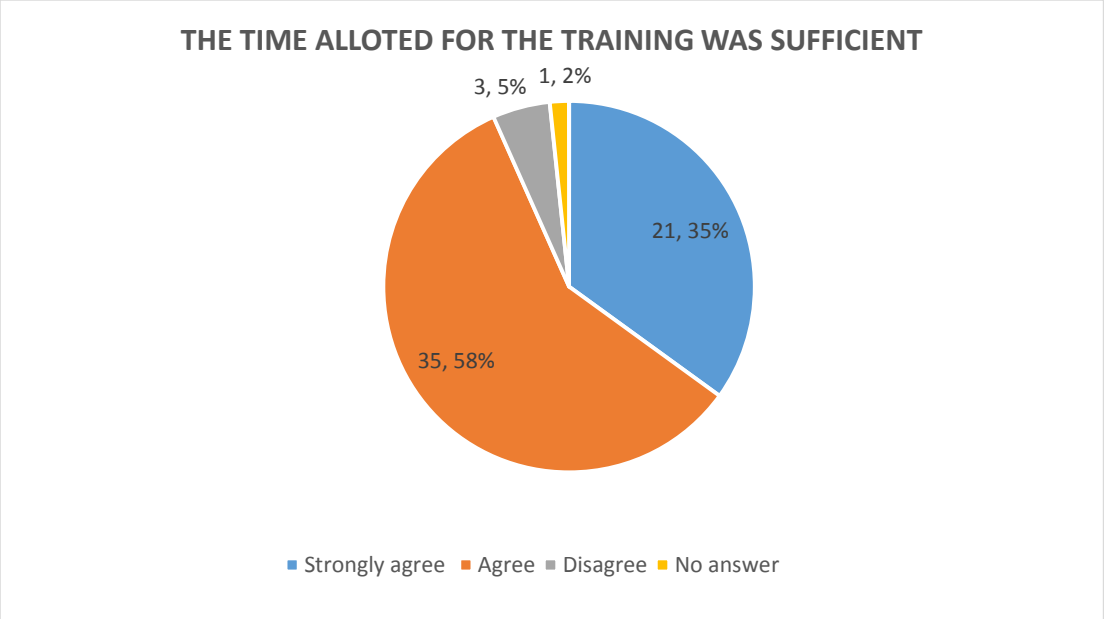
The materials distributed were useful	Quantity	Percentage
Strongly agree	42	70%
Agree	18	30%
Disagree	0	0%
Total	60	100%



Comments:

- Some of the presentation slides were not in the documents provided and some were not in order.
- Very useful and appropriate for this type of events of importance.
- Yes it was helpful, allowed us to continue step by step the conferences.
- Very good.

The time alloted for the training was sufficient	Quantity	Percentage
Strongly agree	21	35%
Agree	35	58%
Disagree	3	5%
No answer	1	2%
Total	60	100%

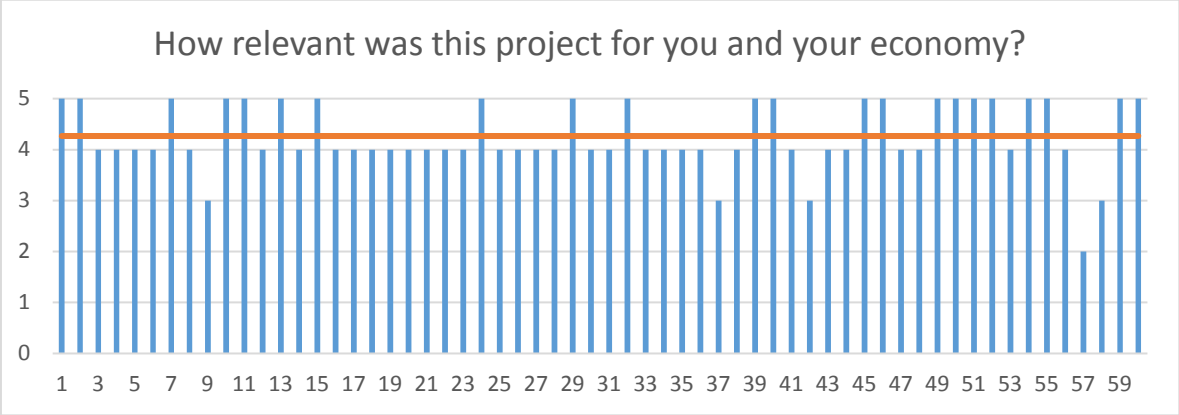


Comments:

- My opinion is that the technical topics should be more extended.
- I consider that the times were short, but enough to create interest.
- In a next conference the topics presented could be reinforced.
- Two days maybe good but extension of another half day maybe best to cover all the topics and issues to be discussed.
- Good
- Each session should be given enough time to conclude rather than having a break in between.
- Appreciate Peru's members for working and preparing.
- Must be more time
- It could be better if the training had more than one level, for example, basic, intermediate and high level.
- The presentations was to be more focused on the topic. Control the times for presentations.
- Presentations were too long.

1. **How relevant was this conference to you and your economy?**

5	4	3	2	1
Very	Mostly	somewhat	a Little	not much



From 1 to 5, being 1 the lowest possible answer, and 5 the highest, the average for the responses for this question was **4,26**. This means that most people found the conference mostly relevant.

Comments:

- Very, for being part of the objectives of CITE Energy. This topic was relevant, because it allowed to learn about the global economy, as well as the advantages and benefits.
- I believe every economy needs to have a set of standards and systems that will promote development and protect the consumers not only on national level but likewise international.
- Very relevant.
- Yes, it is very relevant especially on technologies to design schools furniture.
- Real costs.
- Good to know policies of different economies.
- Very, because it is important to know about how standards and innovation is working internationally in order to improve.
- We have discussed actual issues on standardization of new technologies and innovation.
- Refreshes knowledge.
- New and better ways to do things that can be tried an applied in life.
- My organization is intended to implement standardization activites in small enterprises.
- Everybody here knows about standards and conformance, but some meaning or definitions were not clear before the training, and new after the conference, when the speakers showed several examples. I can say that I could apply it in my workplan.

- Because the materials refer to mostly happen in developing economy. So the variance of the topic to be disccused is very useful for materials sharing by each other economies.
- A lot of new methods and practices were learnt.
- Local industries give some very little consideration to standards and conformity assessment systems. They think technical regulation is the only way for them to use and succeed in their endeavours.

2. In your view what were the conference´s results/achievements?

Comments:

- We could collect experiences from different economies as well as more theoretical reasons that evidence that innovation development can be achieved through a better standardization process.
- Made a quality culture and recognize the importance of standards and conformance on the development of industry.
- Have a better vision of the impact of standardization in other economies.
- Promote participations on innovation at all levels.
- It was fruitful because it allowed us to learn about realities from other economies compared to ours with the objective to learn the good and eliminate the bad.
- Transmit the public the importance of standardization and conformity in the innovation.
- You were very nice to us. You let us know about the importance of standards and their advantages when applied.
- Understand the importance of innovation and the standards in the contribution to the Gross Domestic Product of the economies.
- Provide a vision of the general aspects and more linked to the technical standards (non mandatory standards that are useful to the privates).
- Have knowledge on economies that exist which reality is similar to the Peruvian one, and with that we can propose strategies that can improve ours working in an integrated way with different state views and private views (academy, ministries, local government, Non Govermental Organizations, among others.)
- Promote standardization in the MSMEs.
- Find common challenges shared by economies.
- With respect to the knowledge, it is satisfactory

- A very detailed presentation on the action of the economies in the field of innovation, metrology and standardization was done, which helps us to identify opportunities for the management of our businesses, unions, committees and the state.
- Know the experiences and impacts of the application of the technical standards in other economies, as well as knowing the role performed by the accreditation organizations, conformity evaluators and others in these experiences; which will serve us to apply/improve these initiatives in our economy.
- Learn developed experiences in similar labor to ours.
- It achieved to internalize the necessities to work in conjunction with other APEC members, in the standardization topic and there is much more to get close and work.
- Update in normative matters.
- Learn that we have similar problems that we should work better in the communication topic.
- It fulfilled the topics diffusion, which add value to our sector.
- Learn experiences of the other economies in the management of innovation. Some of the economies being similar to ours, that allowed us to collect cases or examples very useful to be put at practice.
- The standardization of quality in products and services is basic to break commercial barries at world level. Innovations should go along with the technological advances and technological requirements of the new times.
- We can learn from the experiences and how other economies manage standardization.
- In my opinion the results were satisfactory because the present people interacting knew about the importance of quality standards in the process for a globalized economy in the search for development, productivity and continual improvement.
- The exchange of experiences between economies was very diverse but with a lot in common.
- It allowed to learn valuable experiences of the economies which presented.
- The good presentations with emphasis on innovation, which are an area of interest of our economy.
- Excellent networking and opportunity to understand different economies and paradigms.
- The Conference is successful in my own point of view. Participants were active; facilitators and organizers were very efficient and accommodating.
- the Philipines experience and Mr Vimal Mahendru concepts.
- Keep updated with the current innovations conducted in the APEC economies that supports the standards and conformance

- To increase knowledge on standards as an innovation driver, including conformity assessment and metrology as a tool to support technological change and to promote trade facilitation among APEC economies.
- Understanding the role standards play in innovation.
- In getting people from different economies together to learn from one another. Different experiences and views are great resource and inspiration.
- I think it is very meanable to share the same or different point of policies an among APEC economies.
- The place was perfect for the development of the forum.
- Somewhat confirmed that standards and conformance can support innovation. Be up to date with what is happening other economies. Cooperation of experts from APEC economies an actual (urgent) problem in modern standardization.
- All of them give a modern view and how to help innovation for applied in life. It was focusing of the experiences of the APEC ceconomies. Now, we have clear what is a standard, why it is important to apply to get conformance.
- Yes, the conference achieved its objectives, well done Peru!!. We got a knowledge that any problem about standards and innovation in some economies is on typically happen in other economies and the key for the problems is how smart government to solve the problem.
- Overview of different economies to innovation. Great case studies The results should have been a more diverse understanding of how standards bodies work in industry and were government to facilite innovation.
- I learned a lot, I am sure everyone else did as well. The case studies presented makes a lot of sense to the participants

3. What new skills and knowledge did you gain from this event?

Comments:

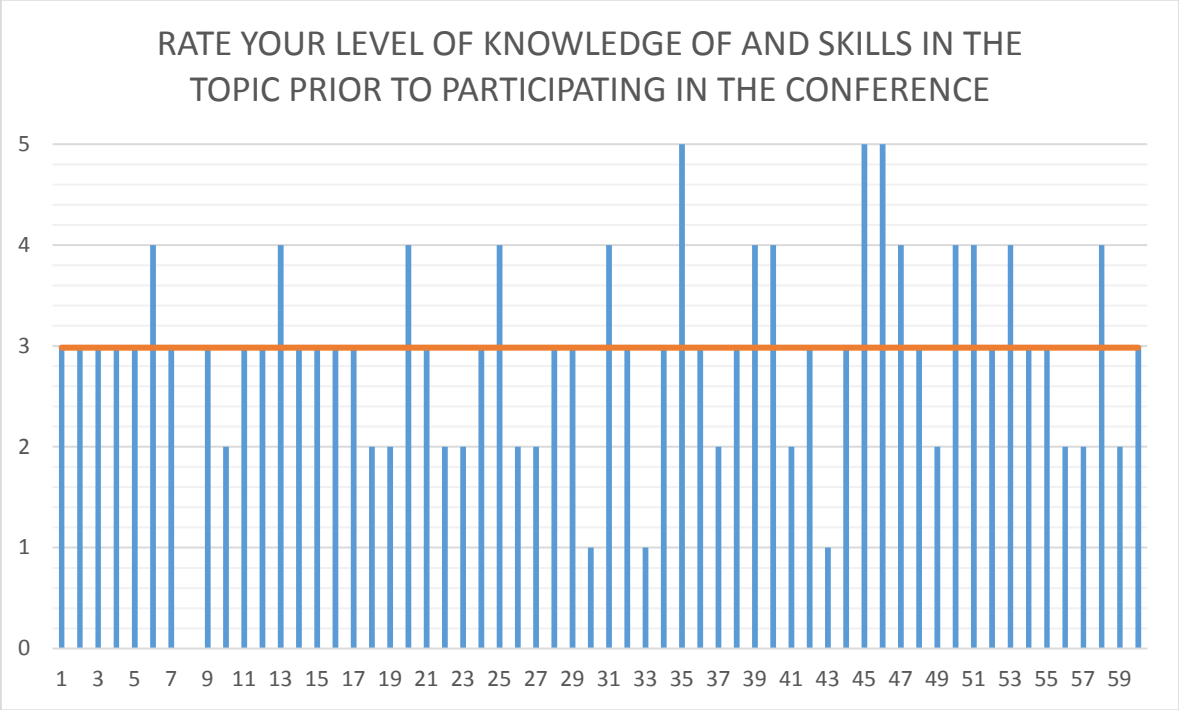
- Know about cases from other economies.
- I was able to know about some experiences from different economies.
- Culture improvement.
- The new innovation technologies.
- Knowledge on the management of standardization from other economies.
- The importance of standardization to facilitate commerce between APEC economies.
- That innovating we can advance with our enterprises.
- Knowledge on the fundamental theory of standardization and its impact in innovation and economic development.

- That the implementation of quality standards are an important key to improve the flow of trade and with that the economy growth, but at the same time it is an integrated work with distinct actors and from my place I can contribute with my participation through the Technical Committees and as local government.
- The importance in the development of our economies through standardization and protect the enterprises.
- Evaluate comparetively the products and services of the organizations presented. Perform "benchmarking".
- How standardization works in different economies.
- The organization structure of accreditation systems and its implementation in other economies.
- More reach in the field of innovation generation.
- More understanding in the relation between the application of standards and the innovation. Better knowledge of the application of standards and the role of related organizations as a way to improve the trade between economies.
- Intervention modalities to achieve a higher impact.
- The necessity to innovate to get more results. To adapt to a globalized competitive world demands quality, creativity, technology and persistence.
- The use of data bases or library documentation centers.
- It is hard to observe when we are the receivers. More than knowledge we can see the experiences from other economies, of how to use standardization as a support to the organizations.
- The application of improvements in our lab test processes.
- I learned about the management and activities of the APEC fora. It was learned that for diffusing technology and dominating the market, it is important for global competivity, the adoption of international standards related to each sector of the industry. For linking innovation to the development of standardization, it is important to learn about international standardization previously. The training and update of the knowledge of the human resource is vital for the development of industry and the growth of the economy.
- New ideas, refreshing knowledge on different sectors. Some of the knowledge that I could acquire: The skill to measure quality from different areas and angles, looking for indicators.
- Concepts on how APEC economies manage and their different connotations to ours.
- The importance of the technological innovation, accreditation and the transfer of the knowledge and the role that these play in the state for these tools to reach MSMEs.
- To get deeper information on standardization, metrology and its link to innovation.

- Nanotech: Best practices from developed economies and how they developed through strategic plans and proper collaboration.
- The information of SMEs presented by member economies and overlap in the different economies. Progress on technologies contributed to the standardization development.
- Standards, conformity assessment and metrology positively impact innovation.
- Greater appreciation of other economies' efforts to promote innovation.
- About usefulness of accreditation and standardisation of innovation that serve local needs (Indonesia and the Philippines).
- I gain the information about the policies of other economies.
- Variety of policy tools exist to link standards and conformance with innovation. Importance of innovation, standards, experience how others do.
- Examples from different economies on invention and innovation by standardization.
- Solar panels, solutions for my economy.
- About how to improve and how to apply in the different ways, special industries and more in our lives
- Nanotechnology and standardization and innovation and smart cities. The most important thing is: I am very concious that we must promote standardization and develop skills to innovation.
- Knowledge of the relationship between standardization and quality infrastructure and innovation.
- Majority about standardization and innovation at practices. Unfortunately, the topic refer to fundamental concept about standardization and innovation never discuss in this event. I think importance.
- Case studies gave insights into products in other economies n/a.
- Gained a boundless of information but two things mattered (1) IEC's AC/DC evolution (2) example on gasoline - LPG outboards was interesting. As the standards and conformance lead in our economy, policy development connecting it to innovation development is very much appreciated.

4. Rate your level of knowledge of and skills in the topic *prior* to participating in the conference:

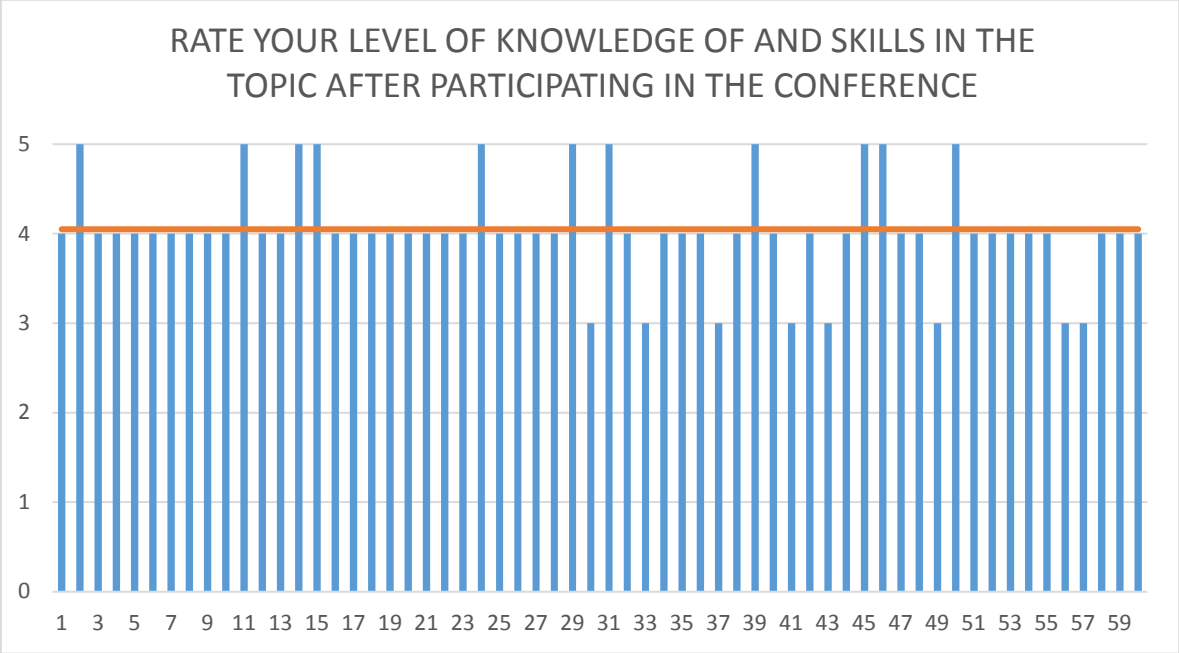
5	4	3	2	1
Very	Mostly	somewhat	a Little	not much



From 1 to 5, being 1 the lowest possible answer, and 5 the highest, the average score for this question was around **3**. Meaning that people prior to the conference had some knowledge on the topic.

5. **Rate your level ok knowledge of and skills in the topic <u>after</u> participating in the conference**:

5	4	3	2	1
Very	Mostly	somewhat	a Little	not much



From 1 to 5, being 1 the lowest possible answer, and 5 the highest, the average score for this question was **4**, meaning that after participating the conference, most people left knowing the topic pretty well.

6. **How will you apply the conference´s content and knowledge gained at your workplace? Please provide examples (e.g. develop new policy initiatives, organize trainings, develop work plan/strategies, draft regulations, develop new procedures/tools, etc).**

Comments:

- Propose strategies for the standards to facilitate more the innovation in the different sectors.
- Develop training on the importance of conformity assessment and standards.
- Organize training, develop plans and strategies.
- Organize training to promote what has been learned in the conferences.
- Reach consensus from stakeholders to apply standardization in innovation.
- Let us know in our business that we are all involved in growing, and that formation and training of personnel is important for the development.
- Develop projects of basic research focused in the innovation for the wood and furniture sector. My reports would be more solid with more theorical information.

- Develop work plan proposals to perform as local government from our competence.
- As lawyer, to transmit the knowledge to other areas of my work, promoting the knowledge, and in the other hand, to participate in the elaboration of the standards and policy initiatives to promote the development of the economy.
- Organize training for sensitizing the textile sector with respect to the necessity to close the big gaps between standardization and conformity assessment, which has been evidenced with the economies who are our commercial partners, in the framework of APEC.
- Develop new iniciatives of policies.
- With purpose of working in one service company of test analysis and certification, the application of knowledge is related to improve or broadening the implementation of accreditation services, through the area of consultancy to increase the diffusion of the incoming benefits of accreditation and innovation.
- The knowledge will be diffused through papers to present in international congresses, as well as I will be presenting conferences in Lima, with respect to the transfer of knowledge and innovation.
- Transmit through the training, the enterprises that have few or no knowledge of standardization of products, advantages and benefits of applying technical standards.
- Develop activites to get more diffusion of the results.
- My work is related to the energy sector, specifically to the development of rural energy. India and China have much more economic development and that makes us to establish a cooperation frame to initiative programs in Peru, and to promote the aplication of public policies oriented to the masive use of the fotovoltaic energy in the houses of the main cities with high yearly solar incidence in our economy.
- Implementation of the normative plans according to the time and place of implementation.
- Inside the trainings that we offer as a service unit of the educative institution.
- Develop new initiative of policies.
- Implement training and promote it broadly in the energetic sector.
- Organize trainings in the work areas.
- Promotion of the activities of APEC in the committees and other interested parts.
- In the first place, propose to the maximum authorities to retake ISO 9001 and ISO 17025 with which were working, and to execute everything that goes along with it. With respect to the private sector, to promote the adoption of ISO 9001 and other ISOs and standards.
- To propose strategies for activities in 2017. The training would be in the area of quality, since this is being implemented in the area. Furthermore, it would be applied at the level of learning labs, production and innovation. Organize joint projects based on the results.

- Let all professionals know about the received information that could allow for work groups about some selected topic to reach medium and long term objectives.
- Coordinate on new proposals with the regulatory agencies of our economy, evaluate regulatory impact, among others.
- Daily work.
- To develop work plans and strategies; improve the procedures and systeMs
- I think in policy initiatives, strategies and certification scheme.
- Participating in committees and work groups related initiatives aimed at improvement projects of SMEs public consultations/seminars etc to communicate the results of the ConferenceDevelop a project/program or initiative which links standards, conformity assessment and metrology.
- Pilot projects, new tools.
- New policy, pilot study and discussion.
- I'd like to organize trainings and develop work plans.
- First to share it with the people in my entity in order for the standardization concepts to be more clear and in relation to the innovation through the design of quality infrastructure standards for furniture.
- May create new policy tools to support innovation by standards and conformance.
- Work in standards certifications, share the information with the work team.
- Organize trainings.
- Contacting the adequate organizations. Designed new policy initiatives strategies, sharing knowledge, aligning ways to do things.
- Increase workshops of standardization activities.
- At first, I need to make a plan to work with some strategies to read all the people in my university and they can know about standards and economy development.
- Contribute towards policy development and plans and promote in my economy.
- We will try to implement new procedure/tools that are relevant to my economy condition.
- Not sure. Information to be knows of management.
- Some new initiatives will need to be drawn up to propose

7. **What needs to be done next by APEC? Are there plans to link the conference´s outcomes to subsequent collective actions by fora or individual actions by economies?**

Comments*:*

- More workshops should be done in order to collect more succesful cases and to create implementation agreements in the economies.
- APEC should involve the SMEs on the world of Standardization.

- Creation of working groups about quality for interchanging experiences in periodic meetings - videoconferences.
- The representants from Peru in APEC must take advantage of the other economies that have a better development in the field of standardization and conformity in these sectors of our economy.
- Present and elaborate projects on innovation.
- Learn about the experiences from other regions allows us to have examples of growth, which will motivate us to continue with our projects.
- There should be projects that show the experience on how technical regulations are established but that do not generate distorsions in the economy.
- Procedures should be unified at the level of all economies.
- The economies from APEC must promote what they do, people know about APEC and its importance, but not the content, and there should be more promotion of the agreements made here and in the technical working groups.
- It is necessary to have more participation from the business sector through the conferences, which allow to expose the necessities and/or solutions which are picked up by the sector of the state that support them.
- It would be convenient to expose in the next fora, the changes or project of changes of the different economies that participate, related to the exposed experiences in previous fora.
- Facilitate internships between institutions of the economies.
- To set up committees for acting and monitoring of the Post APEC results.
- Have a more massive announcement.
- I think the government should promote a high participation of the private sector in the development and promotion of standardization.
- The access to the information to count with standards without high costs for the MSMEs[9] users and the contact channel with APEC.
- The ideas will be taking to the enterprise.
- Two to three concrete activites were proposed to be developed by APEC. This conclusions should be informed to decide its pertinence.
- To create a multiplying effect at the government level to train companies with the benefits of standardization and explain that the adoption of international standards to diffuse technology and dominate the market is essential for global competivity.
- Support them to reach a valuable quality in their products and services to international levels. It would be more important to belong to Fora in the sector that exchange advances and experiences.
- I consider that APEC could help to create a work network between the attendees of the fora, in such way that the work can be continued by smaller groups that have similar interests.

- Follow up the results of this survey and look for the knowledge of the experiences more succesful to the member economies through the technological missions. More work should be done in this area, aligned with the requirements from the Phipippines, and of the next meetings of the leaders in Lima.
- Have themed dialog for developing and developed economies in APEC. There are differences, which must be recognized, the gaps identified and strategies made to reduce the gaps.
- I suggest a fora wherein Standards and Conformance is categorized in different fields/sectors (e.g. housing industry and technology, engineering, health and sciences, agricultural, etc.)
- I think should come up issues like: mandatory and SMEs[10] how colaborating them, how the create integrated confomity assessment, certification scheme.

8. How could this conference have been improved? Please provide comments on how to improve the conference, if relevant.

Comments*:*

- The APEC Conference was useful.
- More time for the presentations.
- The invitation of other working groups of APEC for interchanging experiences and good practices.
- With more participation of the Peruvian expositors in the private and public sector.
- Follow the schedule established in the program. There was time delay.
- There was a good work, the speakers were of great level and totally clear. In my opinion, everything was good.
- There were some headphones that were not working correctly. This could be improved as part of the logistics. Some fora could be made before the APEC participation providing the requirements, necessities and/or doubts from unions of the main economic activities from Peru, in such way that in the expositions of the other economies there are questions directed to solve them.
- The organization of the Conference has been excelent.
- More participation among the attendees in the working groups, debates, workshops.
- To discuss the experiences of each economy with the purpose related to our realities and propose improvements in the economies that still do not count with similar projects.
- Brochures and other information of the participating institutions between the materials.
- It was a good technical level.
- To elaborate the agenda guide in Spanish.

- Maybe with any activity like a workshop where the attending public participate more.
- Planning the time of the interventions and or questions of the assistants inmediately.
- I only want to tell you that I feel very happy for attending a conference of this level. Very deserved congratulations the INACAL personnel. Flawless organization of the conference, which is a sign of the developed dedication with good planning. The satisfaction of the foreign participants is evident, who may feel proud for everything reached. I don't know if what I am commenting is an exaggeration, but I only say I have felt and I perceived. Honestly, I feel very thankful for everything lived in the 18 and 19 August 2016.
- Dedicating more time to the presentations.
- Really good organization, topics, shorter presentations. There were presentations in which some of the topics were repeated.
- Time management of the lunch affected the time of the conference.
- With respect to the Peruvian participation, it should have been presented more on the main sectors of industry (minery, fishing, textiles and agro industry), the advantages and the projection and how to make these more competitive. Some of the presentations were given impression of wanting to show that everything in Peru was ok, and there were no real examples of new technologies.
- It was good in my opinion
- It could have been improved if everyone could have been able to participate in the final discusion of the results of the fora. Decisions can be taken based on these and improvements and changes in the economies.
- A summary of each presentation in the native language would have been of great usefulness. The agro industry would have been a good topic useful for the economy. In addition, to learn how the success has been achieved in these economies would have been of great utility.
- It could have been done in three days instead of two.
- Lesser commuting time between venues.
- Provide a template or somehow a pattern of discussion for presentation of economies to be discussed on common ground. (e.g. Prevailing laws and policies development, problems and hindrances in the development of standards, how to overcome the obstacles; best practices and learning from experiences).
- I have new knowledge about the Philippines sharing and AC to DC electric power supply from Mr Vimal Mahendru. Recommendation: Optimize time for conference, asking members of each economy to bring their prepared proposals. That could be done by providing information conferences before start of the conference of APEC.
- It would be better to have some speakers but focused on particular topics rather than having many speakers with many topics that participants might loose their focus.
- Invite more stakeholders to share experience on standards innovation.
- Better time management.

- More interactive presentation, more discussions.
- With more discussion.
- Better to be focused on specific industry sector.
- Perfect organization. Reduce the breaks. Don't cut the presentations before the questions to go to lunch. It is important that the innovation and standards that determine to spread technology and to determine market is essential for global competitiveness.
- Was Ok. APEC should work with all the people convened about the conference and who attended because they can involve in the APEC objectives and can help to develop the economy.
- Conference to finish on time on Day 2 would be great for the delegates. The conference as far as it is good but give a little challenge.
- Reduce presentation time to 15 minutes per presentation. 30 minutes was too long.
- Shorter presentations need to tie in public policy. Presentations should have been more strategy focused.

APPENDIX 4 – Post Conference Survey

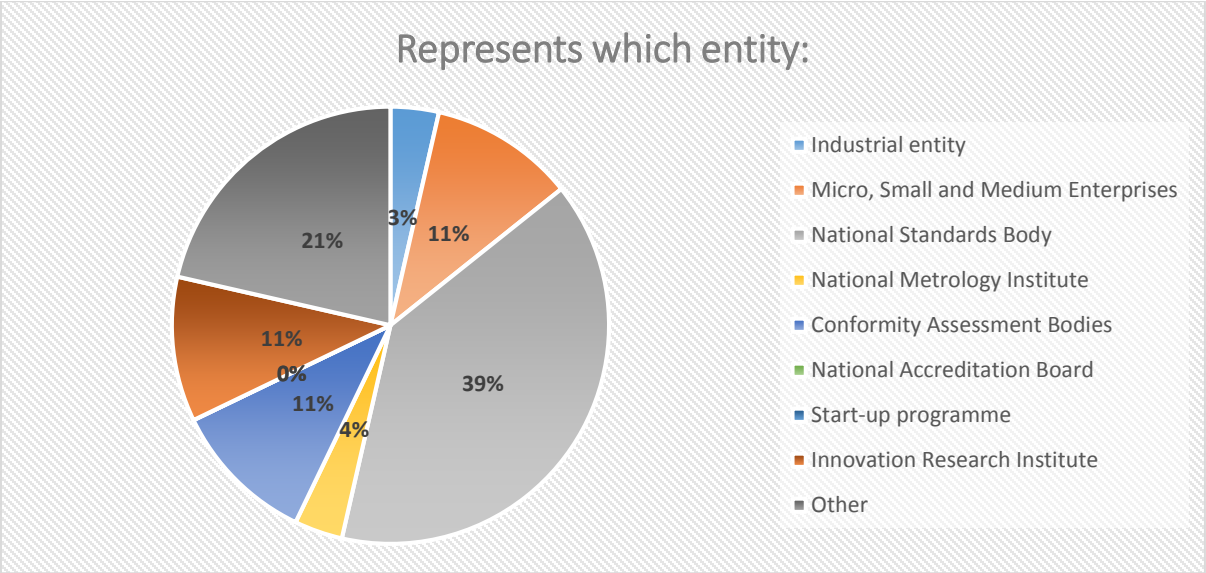
A post conference survey was circulated among conference participants in order to know: if the conference's experiences where clear enough to promote their implementation, their commitment and intention to implement within their own economy any initiative learnt in the conference and their intention to disseminate the project outputs to stakeholders within their own economy. Also, recommendations regarding initiatives and future actions that APEC could take into account for promoting the use of standards innovation, which includes conformity assessment and metrology, were considered.

The fist part of the survey was for gathering information of the contact details of the responders. The second part of the survey was dedicated to the content of the conference.

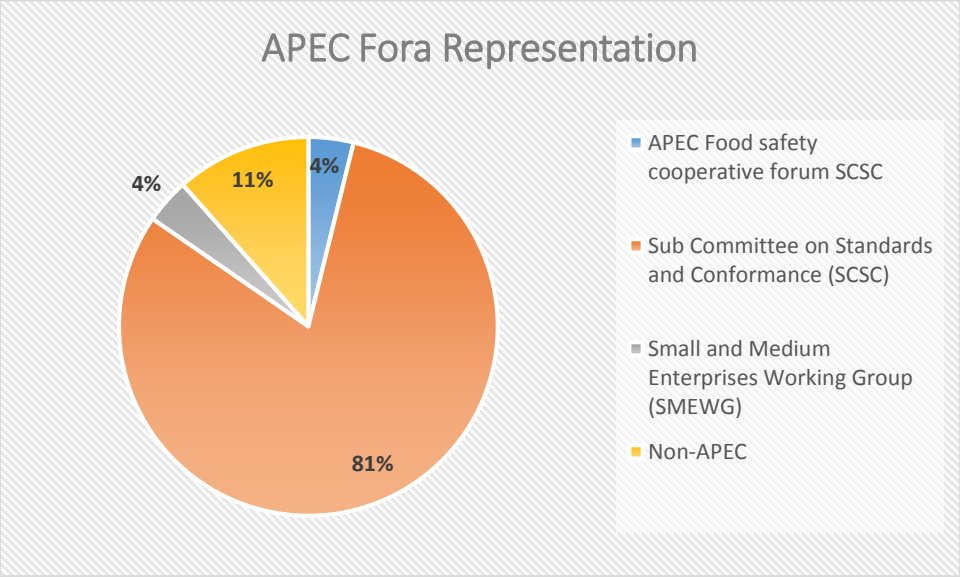
1. **PART A: Contact detail results:**

From PART A, we can extract the following data:

- The total number of respondants was 25, from which 44% of the respondants were women and 56% were men.
- Additionally, 72% of the respondants came from public institutions, 20% came from private institutions, and 8% from others.
- A total of **14 member** economies participated in the Post Evaluation Survey: Canada; Chile; Japan; Republic of Korea; Indonesia; Mexico; Papua New Guinea; Peru; the Philippines; Singapore; Russia; Thailand; the United States; and Viet Nam.
- The following graph shows the type of entities that were represented in the survey:



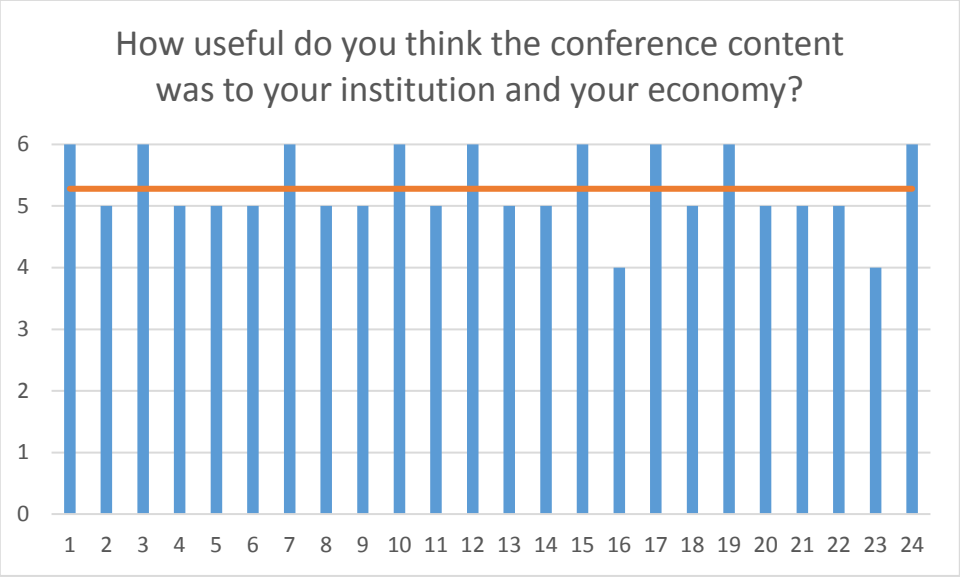
- The following graph represents the APEC foras which were represented:



2. PART B: About the Conference Contents results

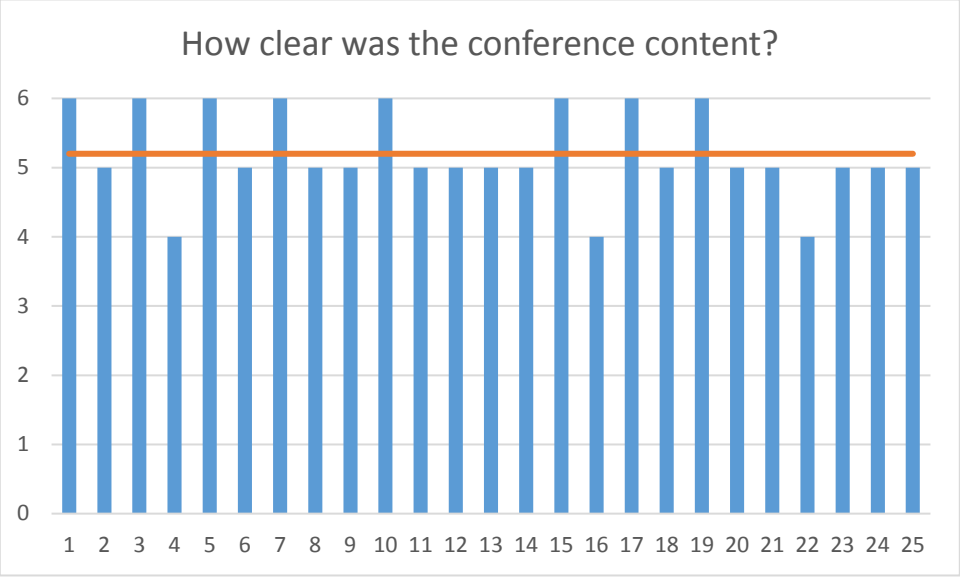
The following questions were made in Part B:

Question: How useful do you think the conference content was to your institution and your economy?



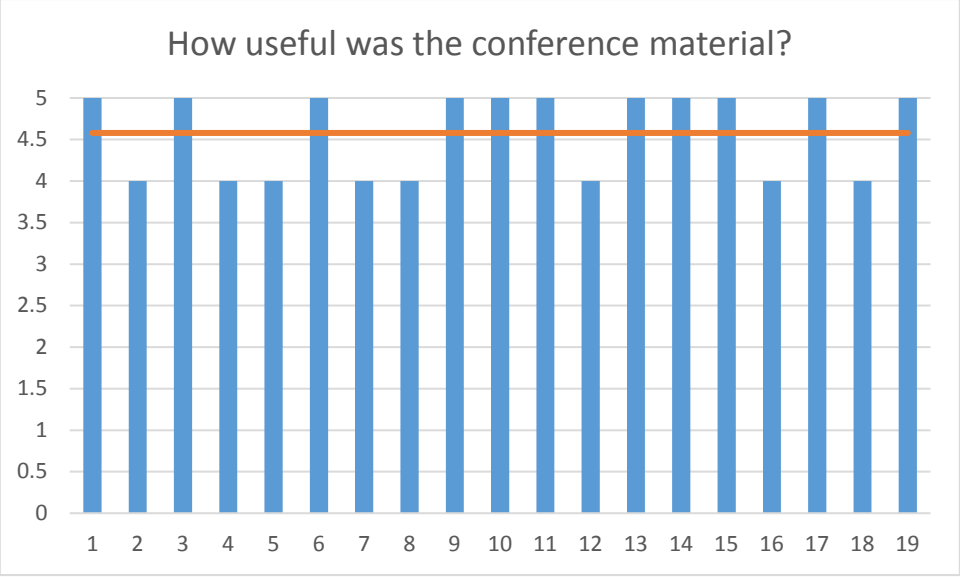
From 1 to 6, being 1 the lowest possible answer, and 6 the highest, **the average answer was 5,28**. In other words, they found the conference content mostly useful.

Question: How clear do you think that the conference contents (presentations) were?



From 1 to 6, being 1 the lowest possible answer, and 6 the highest, **the average answer was 5,2**. In other words, they found the conference content mostly clear.

Question: How useful do you think the conference materials were?

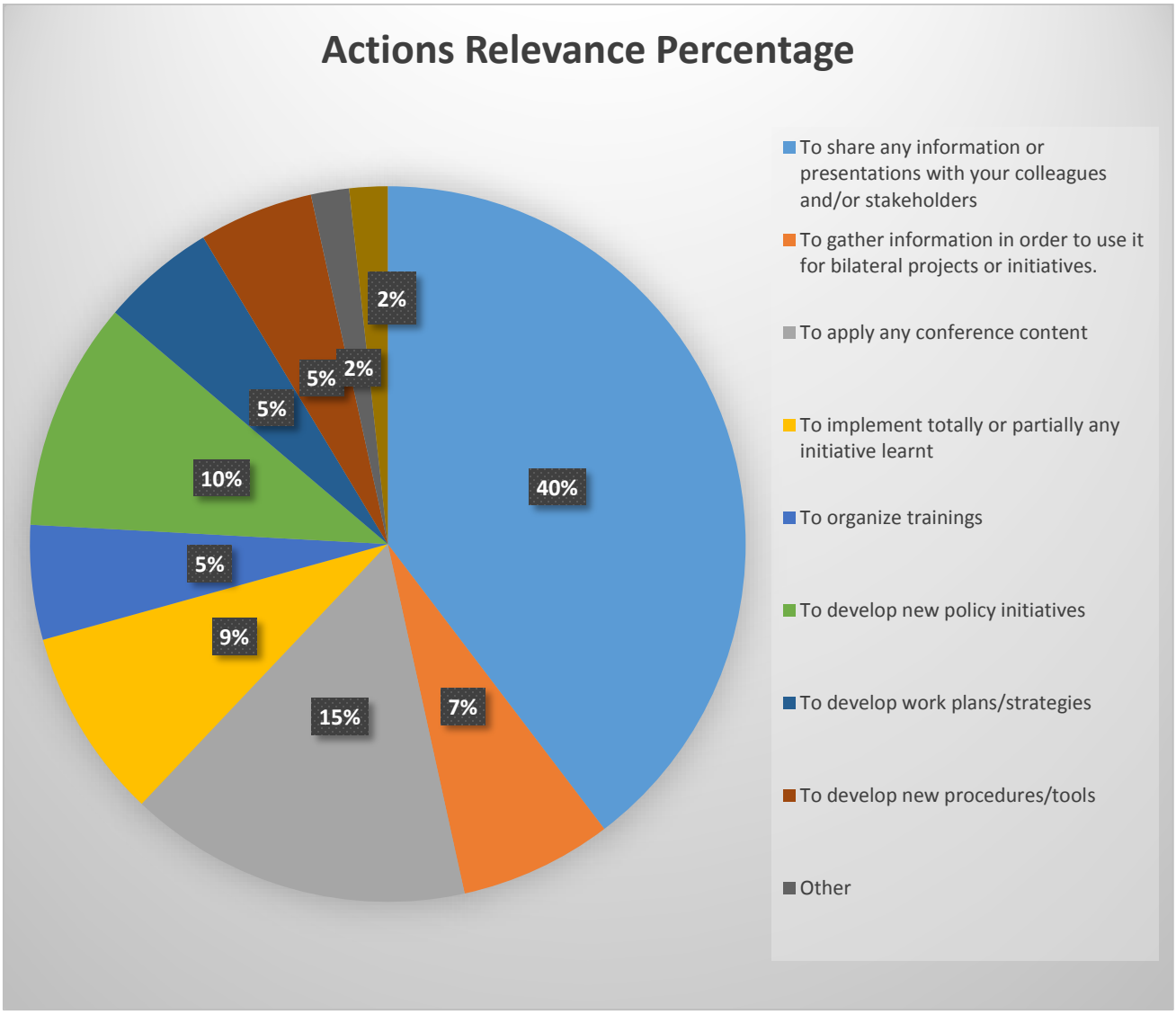


From 1 to 5, being 1 the lowest possible answer, and 6 the highest, **the average answer was 4.5**. In other words, they found the conference content clear.

Question: What action(s) have you done or planning to do with the initiatives learnt in the conference within your economy? You can mark as many as you consider

The following graphs show the distribution for each answer provided:

Actions	Qty	Percent from total (25) of responses	Relevance percentage
To share any information or presentations with your colleagues and/or stakeholders	23	92%	39.66%
To gather information in order to use it for bilateral projects or initiatives.	4	16%	6.90%
To apply any conference content	9	36%	15.52%
To implement totally or partially any initiative learnt	5	20%	8.62%
To organize trainings	3	12%	5.17%
To develop new policy initiatives	6	24%	10.34%
To develop work plans/strategies	3	12%	5.17%
To develop new procedures/tools	3	12%	5.17%
Other	1	4%	1.72%
Not sure	1	4%	1.72%
Total	**58**		**100%**



As the graph shows, most economies were interested in sharing the information or presentations with their colleages and/or stakeholders (40%), as well as applying the conference content (15%) and developing new policy initiatives (10%).

How could this conference have been improved? Please provide comments, if relevant

Comments:

- Categorize different disciplines e.g. as standards in housing, technology, computer system, etc.

- Greater participation of guild and committee participants to develop joint strategies.
- Share more presentations or results from participants after this conference.
- It has been excellent, congratulations.
- I think many speakers in just two days is difficult when you are not an English native speaker, you become so tired.
- The content was excellent, but maybe giving more general presentations not so technic.
- Be a little more punctual with the established program.
- Overall, it was an excellent conference. The only areas for improvement would be in managing the time of the speakers, as many of the speakers went over their allotted time. Perhaps the moderators of each session could be more proactive in ensuring that speakers do not exceed their allotted time.
- Particularly I think that the participation of other economies that can show us their experiences.
- It is important to generate contexts, for example, to use economic variables and / or group by them, to establish comparisons or to be able to reflect better on what is being presented and how to apply it in each economy.
- A technical aspect: make a previous evaluation of the translation company, since there were bad translations and spaces that did not understand the idea or did not translate.
- The conference was well done. Nothing particular to recommend.
- By taking more time for case studies on innovation.
- It was very organized.

Question: From your perspective, what future initiatives or strategies could APEC Sub-Committee on Standards and Conformance do for promoting the use of standards innovation, which includes conformity assessment and metrology? *

Comments:

- Using IT[11] system to promote the innovation. Let them easily for understand and access by everyone.
- Cross-economies Study.
- Before the next standards and conformance workshop, perhaps we can form a working group to consider ideas that will generate strong participation from all economies.

- Categories of the different standards and disciplines to be more specific. Thank you.
- Involving youth and young professionals is important. For regulators and government bodies, it is imperative to understand and learn about the rapid changes in technologies taking place, so that they may build national plans accordingly.
- Use quality standards for education (school and university).
- The participation of the government, not only through the standardization agencies, since government policies must be created that promote the use of standards in all economic sectors.
- Organize more conference to share information.
- Roadmap of future activities.
- To promote the use of standards innovation, including conformity assessment and metrology, to consider the most important impact of productive sectors.
- At first it is difficult to secure the funding and human resources for standards. I think it is important to continue to share the good practices of how to secure these resources. Secondary, the most effective way of promotion will change. I think it is important to analize what media is used in each APEC economy for promotion (newspaper, TV, new media (facebook, twitter, youtube, etc)).
- SCSC[3] could work in Regulatory Coherence initiatives.
- More cuantitative Projects that could assess with hard facts the impact of standards in our eocnomies.
- Through APEC Young Generation.
- Share best practices.
- 1- Improve knowledge of accreditation and metrology issues in MSMEs through courses, events, etc.
  2- Create incentives for MSMEs[9], which implement aspects related to metrology and accreditation.
- More technological interchange.
- I think it would be useful to continue sharing best practices in this area. As there are a number of new initiatives underway by member economies, it would be useful for APEC economies to regularly compare their respective policy initiatives to advance innovation through standardization.
- Spread the benefits of its use.
- To promote quality, the main thing is the knowledge of it, training in quality issues. It is important to generate massive policies, about quality knowledge at an early age.

- Once this has been developed, people who understand innovation will learn about the importance of using standards.
- Service Standards.
- Interoperability and system of systems standards.
- It is always interesting and useful to share good practices on specific issues among SCSC[3] members. Better to focus more on industrial products (not on foods nor agriculture/fishery products).
- Promote standards among the students finalizing high school or at the university.
- Emphasize the importance of standards and innovation to support small enterprises and the role of science and technology.
- After information was collected, a good initiative would be to have a workshop among member economies to define a policies that can be applied in most economies belonging to APEC.

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