

IEC: SHAPING THE FUTURE OF GLOBAL STANDARDISATION AND CONFORMITY ASSESSMENT & THE WAY FORWARD FOR INDUSTRY 4.0



Mr. Alex Looi Tink Huey

Standards had been created since the start of civilisation, for instance, the science of weights and measures to standardise units of measurement for trade, the calendar to predict seasonal changes and agricultural development, standardisation of the railroad gauge during the industrial revolution in the 19th century and so on.

Today, standards cover everything, from the moment we wake up in the morning and use the hair dryer after a shower to the telco networks through which our smart devices connect us to the Internet so we can browse the news and social media. These events are governed by sets of rules and specifications which are written down and published in the form of International Standards to help product manufacturers design products that work together safely and as intended.

Standards are also required by testing laboratories to ensure products are safe to use. Regulators and governments rely on standards to protect the public from hazardous products. Having standards means consumers can be confident that the products they use are safe, reliable, efficient and of good quality.

Founded in 1906, the International Electrotechnical Commission (IEC) is a not-for-profit, quasi-governmental

organisation which develops International Standards and operates Conformity Assessment (CA) systems in the fields of electrotechnology (electrical, electronic and related products, processes and technologies). Its role is to facilitate the complicated process in standards development to reach a consensus or agreement among the many experts representing countries from around the world who volunteer to prepare the rules, specifications and terminology. The IEC provides the platform where industry, academia, research and testing laboratories, governments, consumer groups etc. are represented.

Many national standards are IEC standards; standards and CAs are the two pillars of the IEC. Through its Technical Committees (TCs) and Sub-Committees (SCs), the IEC brings together 171 countries, 20,000 standardisation experts and over 200 TCs and SCs from every corner of the globe to share their expertise and to collaborate on evolving needs and technological advances. TCs and SCs prepare technical documents on specific subjects within their respective scopes, which are later submitted to the IEC members for voting and approval as International Standards.

The IEC runs 4 CA Systems which cover the different areas of electrotechnology, namely:

1. IECCE (system for conformity testing and certification of electrotechnical equipment and components) which covers the safety and performance of electrical equipment used in homes, offices and health care facilities
2. IECEx (system for certification to standards relating to equipment for use in explosive atmospheres) which focuses on hazardous areas where flammable gases, liquids and combustible dusts may be present
3. IECQ (approval and certification system for electronic components and related materials and processes) which covers restriction of hazardous substances usage in electronic products and components
4. IECRE (system for certification to standards relating



IEC Young Professionals welcome gathering – IEC President Mr. James M. Shannon (left) and Mr. Alex Looi Tink Huey

to equipment for use in Renewable Energy applications) which ensures the safety, reliability and durability of solar PV, wind and marine energy conversion technology.

THE WAY FORWARD

Industry 4.0 encompasses production/manufacturing-based industries, marrying advanced manufacturing techniques with digital transformation, driven by connected technologies to create intelligent manufacturing systems which are not only interconnected, but also have the ability to communicate, analyse, forecast and use this information to drive further intelligent actions.

New business models and technologies such as the Internet of Things (IoT), big data, artificial intelligence (accurate diagnosis in healthcare systems, market and financial data analysis, self-driving cars etc.) and additive manufacturing (aerospace and automotive components manufacturing, biocompatible materials for customised implants, life-saving devices in the medical sector, efficient and environmentally friendly energy and power sector components manufacturing, etc.) are driving the change of current business models and shifting the global economics and market structures.

Industry 4.0 is opening the door to connectivity, innovativeness and economic strength, allowing businesses to be more flexible, efficient and resource-saving. The key ingredient to this digital revolution is data. The efficient utilisation of transforming raw data into meaningful information is an essential enabler for future businesses. The wide use of new and advanced technologies requires an intelligent integration system, which can only be achieved if the relevant technologies, interfaces, frameworks and formats conforms to globally accepted standards. Therefore, Industry 4.0 and standardisation must go hand in hand.

Industry 4.0 involves global economic transformation. Hence, national standardisation activities need to be harmonised with international level to focus on stipulating the international collaboration and cooperation mechanisms and exchange of information. In Malaysia, the Ministry of International Trade & Industry (MITI) is spearheading the national transition to Industry 4.0 through collaborative efforts with relevant ministries and agencies, funding and incentives, talent and human capital, technology and standards and digital-infrastructure and ecosystem.

The IEC has embarked on the development of Smart Manufacturing standards with the International Organisation for Standardisation (ISO) such as the participation of Joint Technical Committee, ISO/IEC JTC 1 – the standards development environment for Information and Communication Technology (ICT) to form Working Groups (WGs) to look into harmonising existing reference models and to oversee the development of the underlying architecture for smart manufacturing.

The main pillars or technology drives of Industry 4.0 include Autonomous and Artificial Intelligence (AI) where production or manufacturing processes will become increasingly digitised and interconnected cyber-physical systems. A recent article by the Forbes, Artificial Intelligence Beats the Hype with Stunning Growth, suggests that investment in AI is growing very fast. The Stamford, Conn., firm found that AI implementations grew 37% during 2018, and 270% over the last four years. IDC Corp., an international investment service forecasts spending for cognitive and AI systems will reach US\$77.6 billion by 2022, and notes that 60% of global GDP should be digitised by 2022, driving almost US\$7 trillion in Information Technology (IT) spending. Today, all sectors rely heavily on AI, from finance, manufacturing and robotics to healthcare, transportation, household appliances and even our smartphones which we carry everywhere we go!

AI is evolving and expanding far more quickly than we have ever imagined. So, it is important that AI technology standardisation needs to be considered to achieve global adoption. The AI ecosystem can be divided into 3 key areas involving technical, societal and ethical considerations.



The IEC YP 2018 Community – 80 IEC Young Professionals from 39 countries

How do we implement human ethics in AI? What moral decisions should be made by AI in self-driving cars on life and death situations? For example, if the brakes suddenly fail, should a car steer to the left and probably cause the death of one man or should it steer to the right and cause injuries to 20 people? The AI systems must be transparent to allow users to understand how AI decision-making is made.

The IEC Standardisation Evaluation Groups (SEGs) are established to identify new technical areas and to anticipate emerging markets or technologies such as smart manufacturing, communication technologies and smart home/office building systems. The IEC SEG 10 – Ethics in Autonomous and Artificial Intelligence Applications is set up to evaluate work that covers a broad area of new technologies to identify ethical issues and societal concerns throughout its work, and to collaborate with broader technical committees within the IEC as well as to develop broadly applicable guidelines for IEC committees on ethical aspects related to autonomous and AI applications.

AI helps to streamline efficiency for businesses in smart manufacturing as it can provide insights into where improvements can be made and more importantly, it can provide insights into where businesses can go further in terms of production planning. Standardisation is of central importance for Industry 4.0 which requires an unprecedented degree of system integration across domain borders, hierarchic boundaries, and life-cycle phases. The IEC Standards are playing a key role in the transition to Industry 4.0.

IEC YOUNG PROFESSIONALS PROGRAMME

The 9th IEC Young Professionals (YPs) Programme was held in October 2018, in conjunction with the 82nd IEC General Meeting in Busan, Korea. YPs are hand-picked by their National Committee (NC) to represent their country. Last year, there were 80 YPs from 39 countries, bringing together engineers, technicians and managers from around the world to shape the future of international standardisation and conformity assessments in the field of electrotechnology.

The programme provides YPs with the opportunity to amplify their voices in the international arena, enhances

networking and engagement among YPs, develops awareness of how IEC works and ensures the future of technology transfer. YPs also meet their peers, IEC officers and technical experts from all over the world. Malaysia is a full member of IEC, led by Standards Malaysia (National Standards Body) and the Malaysian National Electrotechnical Committee (MyENC).

At the 9th IEC YPs, Malaysia was represented by Mr. Lim Sai Seong from The Electrical & Electronics Association of Malaysia and Mr. Alex Looi Tink Huey from the Institution of Engineers, Malaysia.

At the Busan Exhibition & Convention Centre (BEXCO), YPs were greeted warmly by the Korean host committee. The programme started with the IEC President's address by Mr. James M. Shannon who said IEC recognised that young people had a different understanding of technology and so approached issues differently. He stressed on the importance of having an open, forward looking, transparent and nimble mindset and said involvement with the IEC will serve the needs of the global market and improve our quality of life.

By attending and observing the Standardisation Management Board (SMB) and Conformity Assessment Board (CAB) meetings, the YPs gained insight into how IEC management meetings operate. The IEC Council delegates to the SMB the management and supervision of the IEC standards work: Responsibility for the setting up and disbanding of Technical Committees (TCs) and Subcommittees (SCs), approval of their scopes, appointment of TC/SC Chairs and allocation of secretariats, allocation of standards work and timeliness of standards production.

CAB manages and supervises the IEC conformity assessment activities, including oversight of the IEC conformity assessment systems: Responsibility for setting the IEC conformity assessment policy, promoting and maintaining relations with international organisations on conformity assessment matters and creating, modifying and disbanding conformity assessment systems.

The YPs were also invited to attend the IEC GM 2018 opening ceremony, which was attended by over 3,300 delegates. The theme for the 82nd GM was Smart Cities

FEATURE

& Sustainable Societies. South Korea's President Moon Jae-in also welcomed IEC delegates to Busan. "The world today is experiencing a wave of innovation ushered in by the 4th Industrial Revolution. Such innovation is a result of new technologies emerging in the electrical and electronic fields, with artificial intelligence, IoT and big data at the forefront. At this general meeting, I hope to gather insights into the role and contribution of standardisation in responding to Industry 4.0," he said.

The IEC YP 2018 programme successfully brought together the whole IEC YP community, to share their thoughts with IEC and for further involvement in IEC work. It provided an exceptional platform for networking opportunities with IEC delegates to build knowledge, exchange creative ideas and expand professional contacts.

The programme also fostered a culture of innovation and teamwork among YPs to be ahead of the technology curve in the electrotechnical field. Together with Standards Malaysia, Mr. Alex Looi and Mr. Lim Sai Seong will continue to initiate the development of the IEC YP programme in Malaysia to encourage the involvement of the future generations in IEC work, to develop consensus building skills which are essential for IEC work and to reach out to organisations, conferences, academia and trade associations. ■

Author's Biodata

Mr. Alex Looi Tink Huey is Head of Projects for Malim Consulting Engineers and LAJ Engineering. He is a Committee Member of IEM EETD and Chairman of Activities Organising Committee.