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An effort of the Department of Industrial Engineering - University of Surabaya in order to Provide Human Resources in the Field of Standardization

Abstract

The needs of professionals in the field of quality and standardization are increasing with the open free market world. Department of Industrial Engineering-University of Surabaya anticipates these needs by developing curriculum in 2010, which include a variety of elective courses in the field of standardization. In addition, learning methods are designed with attention to the attractive delivery methods and gives students the opportunity to realize the abilities and skills in a project task in order to the achievement of specified competencies in the graduate profile.

Although it was unknown by the students, the subject in the field of standardization is quite interesting for the students, with the increasing number of participants in the subjects of standardization, quality management systems, and safety and health management system. Similarly, evaluation of the learning process conducted by the students showed good performance results, and furthermore, there is increasing research to final project in the field of quality and standardization.

In addition to following the regular lectures, students also increased insight about the standards with the opportunity provided by the management of the Industrial Engineering Department which is supported by the National Standardization Agency (BSN) in the organization of events such as exhibition on education about standardization, implementation of the standardization game competitions, and workshops for quality management system.

Hopefully, all the efforts that have been undertaken by the Department of Industrial Engineering, is contribute to provide of professionals in the field of standardization required by the business community and industry in Indonesia.

Keywords: Curriculum of Industrial Engineering Department in 2010, Elective subjects in the field of Quality & Standardization

1. Background

Challenge of Indonesia in the future will be even greater, especially in relation to the free trade agreement China ASEAN Free Trade Agreement (CAFTA), which has been applied effectively in 2010. This can be observed with a variety of global products into the Indonesian market. In order to take advantage of this deal, the Indonesian government should continue to encourage manufacturing and service industries to meet the requirements of both national and international standards that became one of the prerequisites of global trade. Pane (2011), stating that the industry in the primary sector, upstream, downstream and tertiary needed human resources who know about standardization. Therefore, he suggested the need to learn about standardization on all courses at universities related to the value chain system, or which involves the input-process-output in production process, especially subjects related to the production of goods or services,

service management and systems of measurement or metrology.

Related with the learning system in the field of standardization, Zen (2012) suggest that the need for improvement of the system of knowledge that comes from the context of the need at industry, so that the harmonization of knowledge between industry, certifiers with higher education became more harmonious. Furthermore, he stated that the provision of human resources in the field of standardization is essential to improve the capacity of the learners to be able to measure quality, classify quality, and make decisions in assessing and treating products or services economically and socially. Learning of standardization is more effective when incorporated into the course curriculum. In fact according to Setiadi, (2011) stated that one of the items in the ISO Action Plan for Developing Countries is a standard education curriculum. Until 2011, National Standardization Agency (BSN) has formed a partnership with 28 universities across Indonesia. BSN realize the importance of the involvement of universities in delivering standards, providing graduates who are ready to develop standardization in Indonesia. Therefore, the role of the universities is very strategic in enhancing the nation's competitiveness based on knowledge, improving the quality of labor and the quality of education and training systems.

To anticipate the needs of human resources in the field of standardization, the University of Surabaya has done Memorandum of Understanding with BSN for the implementation and development of education about standardization. One form of cooperation is entering subjects Standardization into the curriculum of Industrial Engineering Department. Design and Development of curriculum of Industrial Engineering Department of University of Surabaya one of which is based on the results of a tracer study to user and alumni, which indicates the need for graduates who are competent in Production Planning & Inventory Control (PPIC), Quality, Logistics and Supply Chain fields. Specifically for experts in the field of quality and standardization, is the need in the implementation of quality management systems, environmental management system, and occupational safety and health management system, (Curriculum of Industrial Engineering Department, (2010)). Moreover, according to a survey conducted by Rosiawan (2012a), it showed that for professionals in the field of quality and standardization, working as a Management Representative, Document Controller, Internal Quality Auditor, and Quality Assurance.

2.   Challenges

This paper focuses on how the efforts made by the Department of Industrial Engineering- University of Surabaya in meeting the needs of graduates who are competent in the field of standardization through a set curriculum, implementation subjects of standardization, quality management systems and health and safety management system, etc., implementation of project assignment , as well as additional training given to students related to the implementation of standards in the industry of manufacturing and services.

3.   Literature Review

Department of Industrial Engineering-University of Surabaya (UBAYA) as one of the private universities which are well known in Eastern Indonesia always wanted to realize its vision of being the first university in the hearts and minds of the people of Indonesia, by continuing to create product / service quality and added value in the areas of teaching, research, and community service. One of mission of the UBAYA's is to produce graduates who are focused on an active role in promoting the business and industrial community.

Department of Industrial Engineering - UBAYA, is committed to producing graduates who have the knowledge, skills, and professional attitude as well as the spirit of entrepreneurship and innovation in the face of the challenges of a career in the global era in the field of design, implementation, and improvement of integrated systems management in manufacturing and services, which consist of components humans, machines, equipment, money, energy and information with integrative and systemic approach. Expected, the integrated system can function optimally.

Design and development of curriculum of Industrial Engineering Department, focused on the ability of graduates to be able to do engineering processes and systems in order to improve the quality and productivity of an industrial system. They worked to find a better solution in order to eliminate waste of time, money, materials, energy and other commodities. Profession of Industrial Engineering graduates can work in various fields, such as purchasing and inventory manager, supply chain manager, logistics manager and distribution manager. While in the field of quality and standard, worked as a quality engineer, quality manager, quality

assurance manager, quality control manager and quality consultant. Meanwhile, for the production field, some options that can be taken such as the production manager, production engineer, manufacturing inspector, manufacturing engineering and industrial engineering development.

In order to improve the knowledge and additional skills relevant to graduate to the latest developments in the industry of manufacturing and services, Industrial Engineering Department also opened three areas of specialization namely:

- Supply Chain System Engineering and Management, to learn about Integrated Supply Chain Management which is a competitive strategy in improving the quality of services to consumers through a network of cooperation with other organizations to effectively and efficiently.

- Quality Engineering and Management, to learn about the manufacturing quality systems, services and interactions between them. Subjects offered provide knowledge on how to make good engineering and management, applications in industrial environments as well as its implementation in the world of work both at the executive level as well as the production floor.

- Ergonomics and Safety Management, to learn about the knowledge in the system design and production systems work better viewed from a health and safety as well as environmentally friendly, also the application of ergonomics in product development and implementation of safety management on the production floor.

For the field of Quality Engineering and Management specialization, standardization subject are subject support for advanced subjects such as: quality management systems, health and safety management systems, environmental management systems, quality and supply chain management, quality improvement, quality engineering, leadership for quality and change, etc. Here are some descriptions of frequent subjects taken by students.

Standardization (63B151),3 credits. This subject gives briefing to students on the basic principles of the standard, the standard anatomy, implementation of standards, metrology and conformity assessment and the development of national or international standards in various sectors of business and industry.

Quality Management System (QMS) (63B153), 2 credits. This subject gives briefing to students about the principles of good production / service practices, documentation of the quality management system, implementation of a quality management system based on ISO 9001 as well as techniques to run internal quality audits in an organization.

Occupational Health and Safety – Management System (OHS-MS) (63B204),3 credits. This subject gives briefing to students on principles, systems and technical support OHSAS 18001, hazard identification, risk assessment and determining controls; documentation, implementation and audits - OHSAS internally in an organization.

The learning method for this subjects is delivered through teaching in the classroom and outside the classroom, such as providing project tasks to students in the form of educational game development, observation of implemented the standard in production processes in manufacturing or services, and visits to companies that have implemented standard or a visit to the institution of products certification, etc.

4.   Research methodology

The methodology used for this study were: (a) the implementation of the teaching of subjects in standardization, quality management systems, and safety management system, (b) the results of student project assignment, (c) evaluation of the learning process, (d) the student final project-related to the quality or standardization, (e) tracking graduates who already work in the field of quality/ standardization, (f) Increased knowledge of the standards through joint activities with BSN

Object of research are students who take subjects in the field of Engineering and Quality Management.

5.   Results and Discussion

a. Implementation of teaching for subjects of standardization, quality management systems and health and safety management system. Learning Process for the third subjects is conducted through teaching in the classroom, giving case studies, giving a project assignment such as creating a educative game related to

the understanding of standards such as Indonesian National Standard, or ISO standard, or documenting of the management system, and invited practitioners to giving lecture, visits to industry, the presentation of project assignment and conducting of a midterm and final exam per semester. The number of participants for the three courses in the last five semesters has a tendency to increase as shown in Table 1, (except for standardization subject in the second semester 2012/2013, the number of participants decreased because they have taken the subjects in the previous semester.)

Table 1. The number of students participating in the subjects of standardization, QMS and OHSMS

Period	Number of students		
	Subjects of Standardization	Subject of Quality Management System	Subjects of Occupational Healts & Safety-Management System
Even Semester 2010/2011	22	21	11
Odd Semester 2011/2012	45	Subjects didn't opened *)	
Even Semester 2011/2012	30	23	Subjects didn't opened *)
Odd Semester 2012/2013	36	Subjects didn't opened *)	
Even Semester 2012/2013	16	28	17

Note: *) For subjects that did not opened in the semester (e.g. of QMS and OHSMS) because of the industrial engineering department policy that states that if the number of students taking elective courses less than 10 students, the subjects did not taught for the semester.

Figure 1-4 shows the variety of delivery methods for subjects of standardization, QMS and OHSMS such conduct field study in industry, industrial visits or guest lecturers from practitioners. Delivery methods of learning such as this can provide practical knowledge to the participants related subjects with knowledge in the field of standardization, conformity assessment, and systems of measurement (metrology).

Figure 1.Students play a role in the process of drafting RSNI guided by a member of the SNI-Technical Committee, 2010

Figure 2.Visiting to the testing laboratory at Surabaya, 2011

Figure 3.Lecture field at Institution of Product Certification, 2011

Figure 4.Industrial Visit to Lubricants Unit at Pertamina Corp, 2012

b. **The results of student project assignment**. Implementation of project tasks for each subject is given in order to provide practical experience related to the theories taught in the classroom. Each task is given in accordance with the competencies that have been set in the curriculum. Each project task for subjects can be explained as follows.

Standardization subjects: (a) identifying the needs of the Indonesian National Standard (SNI) in the community, (b) development of educational games on standardization and dissemination games to high school students, (c) play a role as a technical committee in the process of drafting SNI, (d) a summary of the results of the visit to the industries that have implemented the standard. Especially for development of games about standardization are the most interesting tasks for students. Because, through games created, students can actualize their understanding of standards / SNI into an fun game like Puzzle SNI, UNO cards SNI, SNI Giant Monopoly, etc., then the game is disseminated to students or exhibited to the public in order to increase their understanding of the standards/SNI. For example Standardization Game Competition event in 2011, followed by 30 teams (@ 3 students) high school in Surabaya city and surrounding areas, most of participants (students of high school) stated that the game is exciting and can increase their understanding of standards/SNI which published by BSN. (Rosiawan, 2012b). Similarly, event for game competition held back in the Industrial Games 21st in 2012 organized regularly by student of the Industrial Engineering Department, which for this time working with BSN with the theme of standardization of "Think Quality, be Qualified" followed by 68 team (@ 3 students) high school in Indonesia. (see figure 5-6).

Figure 5
Event of standardization game competition

Figure 6
Event of Industrial Game 21st (game of SNI)

Quality Management System subjects: giving this task aims to give students the ability to: (a) identify the gap between the implementation of management system for Small & Medium Enterprise (SME) with standards of Good Manufacturing Practices (GMP) for SMEs based on rules of the Agency for Food and Drug Administration – BPOM Indonesia), (b) documenting of Quality Management System, and (c) conducting internal quality audit training with live audit. Task for gap identification is a task that most interest to students. In addition to observed disparities enterprise management system with GMP requirements, they are also to disseminate to the SMEs on how to conduct a viable food production, quality, safe to eat, and in accordance with the demands of consumers both domestic and international customers, according to the decree of the Head of the Food and Drug Administration of the Republic of Indonesia Number: HK.00.05.5.1639 dated 30 April 2003 on the Guidelines of Good Food Production Method for Household Industry. The results of student tasks for three last semesters at fifteen SMEs (home industry) such as home industry for production cakes, meatballs, tofu, tempe, etc.. showed that of the 17 required by the BPOM aspects related to GMP, many of them are still not able to meet the requirements of GMP (with percentage <60%, see table 2.), especially in the aspect of hygiene and sanitation workers, construction and public-building design, environmental sanitation: landfill waste, investing birds, insects, or other animals, plant facilities, operation of sanitation, and the prevention of nuisance animals / insects. For aspects that do not meet the requirements of GMP, by students together with business owners to design improvement in order to meet the GMP standard. Meanwhile, for training of the internal quality audit, is also an interesting task, because here the students to practice quality audit directly in the administrative services unit at the Faculty of Engineering or Industrial Engineering Department, and giving some of improvement related to service delivered.

Table 2.The results of gaps identification in SME (home industry) based on the seventeen aspects of inspection of production facilities from the Agency for Food and Drug Administration-BPOM Indonesia.

Group		No.	Aspects	Frequency	Percentage
I	General requirements	1	A. Perception of leader and management	10	67%
		2	B. Sanitation and personal hygiene	8	53%
II	Condition of sanitation for building and facilities	3	C. Construction and design of building-General	8	53%
		4	D. Construction and design of production room	10	67%
		5	E. Condition of normal warehouse (dry condition)	12	80%
		6	F. Condition of frozen & cold warehouse (if necessary)	N/A	-
		7	G. Condition of packaging warehouse and finished product	10	67%
		8	H. Environmental sanitation: landfill waste, investing birds, insects, or other animals	8	53%
		9	I. Facilities of manufacturing	8	53%
		10	J. Water supply	10	67%
		11	K. Operational of manufacturing sanitation	8	53%
		12	L. the prevention of nuisance animals / insects	8	53%
		13	M. using of chemical materia	10	67%
III	Condition and Sanitation of equipments	14	N. Production equipments	12	80%
		15	O. Handling of raw material and additive material	10	67%
IV	Production and Process Control	16	P. Production controlling	12	80%
		17	Q. Supervision action	10	67%

Figure 7 .Identify the gap between the implementation of management system for Small & Medium Enterprise (SME) with standards of Good Manufacturing Practices (GMP) for SME based on rules of

the Agency for Food and Drug Administration – BPOM Indonesia) conducting by students

Occupational Health and Safety Management System subjects: giving this task aims to give students the ability to: (a) identify the gap between the implementation of OHSMS in a company, (b) drafting HIRARC, Objective, Target, and Program (OTP), (c) documenting of several Standards Operation Procedure for OHS and other documents such as work instruction and form, (d) conducting the OHS internal audit training with live audit. For assignment of making of HIRARC and OTP, it involves process in UBAYA such as learning process in the classroom, in the laboratory and workshop practice, making evacuation routes, etc. One of example of HIRARC result which made by the students at milling machining process is shown in Table 3 as follow.

Table 3. Result of HIRARC at Manufacture Process Laboratory-Manufacturing Study Program

Unit: Manufacture Process Laboratory-Manufacturing Study Program												
Hazard Identification					Risk Assessment							
no	Process	Resources	Hazard	Risk	Risk Assessment			Current Control	Residual risk			Level of Risk
					L	S	RPN		L	S	RPN	
			hand crushed	Broken hand	1	5	5	*Safety Sign*	1	2	2	Tolerable
			Eye contact chip	Blind eye	1	5	5	Goggle glasses	1	2	2	Tolerable
			hair tangled	Loss hair	1	3	3	*Safety Sign*	1	2	2	Tolerable
1.1	*Milling Machining Process*	Milling Machine	Chuck-key thrown	body bruising / bleeding	2	3	6	*Safety Sign*	1	2	2	Tolerable

c. Evaluation of learning process. Finally, the implementation of the learning process periodically of each semester evaluated by the Directorate of Quality Assurance & Internal Audit a through the distribution of questionnaires via online to the students participating in the subjects as a feedback to improve the quality of the learning process. The aspects evaluated included: (a) teaching materials such as the learning process carried out in accordance with the plan set, giving feedback for assignments, quizzes, exams, availability of reference books, (b) Lecturer, such as teaching methods delivered, readiness lecturers in teaching, lecturer response to suggestions or complaints received from students. Table 4 is the result of learning evaluation (in average score, with scale 1-4 of students perception which is: 1 indicate poor performance, 2 average, 3 good, 4 excellent) by students for all three subjects in the field of standardization.

Table 4. Result of learning evaluation for subjects Standardization, QMS, OHSMS

Period	Average score		
	Subjects of Standardization	Subject of Quality Management System	Subjects of Occupational Healts & Safety-Management System
Even Semester 2010/2011	3.93	3.93	3.86
Odd Semester 2011/2012	3.66	N/A	N/A
Even Semester 2011/2012	3.75	3.83	N/A
Odd Semester 2012/2013	3.83	N/A	N/A
Even Semester 2012/2013	still running	still running	still running

Table 4 shows that the learning process has been well implemented with average score is greater than 3.65, however, needs to be improved, especially the suggest of students who expect: (a) an increase in the number of case studies are discussed, (b) an increase in the provision of project assignment game, and play a role in drafting a standard, (c) delivery of material needs to be explained in detail so easy to understand and guide the execution of the task, and (d) an increase in the providing of text books. All suggestion from the students will take action by lecturer in the next semester.

d. Research for final project related with standard and quality topics. Furthermore, students who take the concentration of the quality and standardization field are expected eventually take the final project related to them. As shown in Table 5, although taking the final project in the field of food safety management systems, QMS, OHSMS, GMP, etc. has increased annually but must be continuously improved especially to type of topics.

Table 5. Final Project for student related to standardization and quality

Year	Frequencies	Topics
2010	4	GMP, QMS ISO 9001
2011	8	GMP, QMS ISO 9001, HACCP
2012	14	GMP, QMS ISO 9001, HACCP, OHSAS 18001

e. Tracking graduate who work in the field of Quality / Standardization. Actually, still not many graduates have who work in the field of standardization or quality. However, there is a tendency to increase (see Table 6). Currently, the majority of graduates are working in manufacturing company in the department: PPIC, logistics or purchasing. In addition, interviews with graduates working in the field of standardization or implementer standard, they stated that knowledge and skills acquired during studying in the Department of Industrial Engineering-UBAYA is sufficient to performing task in workplace, and they hope, in the future, Industrial Engineering Department also provide advanced training related to standardization and quality.

Table 6. Field of job for Industrial Engineering Graduates

Year of graduate	Frequencies	Field of job
2010	2	Consultant for Integrated management system (QSHE)
2011	5	Auditor for integrated management system QSHE, QA/QC, Document Control & IQA
2012	5	QA/QC, as a Management Representative, Internal Auditor, Consultant for Integrated management system (QSHE)

f. Increased knowledge of the standards through joint activities with BSN. In order to broaden knowledge in the field of Quality and Standardization, some of the activities carried out jointly by the Department of Industrial Engineering with a BSN, among others: (a) SNI ISO 9001 workshop for students was held in May 2011. This workshop discusses the National Standards System, and the introduction of SNI ISO 9001:2008 that describes quality principles, requirements, application of SNI (b) the various games made by students such as: Monopoly SNI and SNI Puzzle, Standardization of College Life have played by students and the community and also has been exhibited in the event organized by BSN, such as: standardization community meetings for East Java region on April 2011, the national jamboree kids on June 2011 at Jakarta, exhibitions of creative industry and SMEs products at the campus of the University of Education-Indonesia on August 2011, Standardization Game Competition on November 2011, and international conferences ICES & WCS Academic Day on May 2012 at Bali, as well as Industrial Games 21st on November 2012 at Surabaya. The goal of the game on this standardization is contribute to the communities in disseminating standards / SNI is more easy and fun. Some of activities have shown figure 8-11.

Figure 8

Exhibition of the national jamboree for kids at Jakarta, 2011

Figure 9

Socialization of SNI for kids,2010

Figure 10

Exhibition of SNI Monopoly game at International Conference of ICES & WSC at Bali, 2012

Figure 11

Exhibition of Standardization of College Life game at International Conference of ICES & WSC at Bali, 2012

Regularly, BSN conduct monitoring and evaluation to universities that teach subjects standardization. In June 2012, the Department of Industrial Engineering-UBAYA received a visit from two staff education and training-BSN to discuss with some of lecturers and students related to the application of these subjects. In addition to the feedback, they also want to get the experience of teaching UBAYA related to subjects of standardization to be used as lessons learnt and getting the best practice to share other universities.

Conclusion

Since the standardization subjects included in the curriculum of Industrial Engineering 2010, there have been improvements to understanding and application of standards among students. By using an interesting method of learning, the students look more enthusiastic to learn, especially when they are also given the opportunity to making a game about standardization, and to display their work in a variety of events such as exhibition events, as well as racing games on standard / SNI for students in high schools.

In addition, the Department of Industrial Engineering also requires cooperation with other institutions to implement standards such as manufacturing and services industry, universities in order to develop subject matter, BSN for additional insight to students and lecturer related to knowledge in the field of standardization, system of measurement, conformity assessment, etc. its hope in the future, there are also cooperation with institutions abroad to jointly promote education about standardization. In that way, currently, Department of Industrial Engineering will conduct cooperation with the British Standard Institution-Indonesia in training quality management system and internal quality auditors for students, who expect when they graduates, not only to receiving a bachelor's degree but also a certificate as an auditor in the field of quality management system.

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2013 ICES Conference

What does Industry expect
from Education about Standardization?

Proceedings
Henk J. de Vries and Hermann Brand (Editors)

12-13 June 2013

ETSI Headquarters
Sophia Antipolis, France

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Preface

Industry needs for standardization education are the core theme of the ICES 2013 (International Cooperation on Education about Standardization) Conference, hosted by ETSI on 12-13 June 2013 and supported by CEN and CENELEC. The International Cooperation on Education about Standardization (ICES) is a network of individuals and organizations interested in education about standardization. ICES aims to promote education about standardization and improve its quality and attractiveness for all stakeholders.

The ICES 2013 Conference and the WSC Academic Day 2013 both give continuity to the ICES and WSC events organized in previous years: 2010 in Geneva (Switzerland), 2011 in Hangzhou (China) and 2012 in Bali (Indonesia).

Technological as well as business developments make standards indispensable. In order to benefit from standards, companies need proper knowledge about them and about their development. Standardization education should provide such knowledge, both for current business leaders and employees, and – via formal education – for future jobholders and citizens in industry and society.

This conference provides the opportunity to learn from fellow participants from all over the world, from industry, universities, standards bodies and other interested stakeholders in standardization education.

Why Industry Should Care About Standards and Standardization?

In the development of new technologies, companies increasingly use open innovation: they involve parties outside their company in the research and development process. These technologies need business applications. They have to be bundled into commercial offers based on a business model, i.e. into products and services. In this way, systems of interrelated components, products and services emerge, developed by a variety of organizations, then produced by another group of organizations, and delivered to different customers. So technologies, products and services get interrelated and the same applies to the organizations involved in design, production, distribution and use – supply chains and networks instead of vertically integrated single organizations. In such value chains, standards specify the interfaces between the elements of the system, and provide criteria for system elements as well as systems as a whole. Due to the shift of value creation from products to services, service standardization becomes more important, additional to technical standardization. A company's competitive position depends on its ability to use standards. Companies being able also to influence the standards have a major competitive advantage.

What Does Industry Need From Education about Standardization?

Not all companies understand this essential role of standardization and reap the full benefits. This applies to SMEs but to bigger companies as well. Standardization education should provide the necessary awareness and knowledge. Therefore, the main target group for standardization education is industry: directly (in the case of post-formal education and training) or indirectly (preparing current students for their future role in industry). These industry needs form the main theme of the ICES 2013 conference: why does industry need standardization education and, next, which education exactly do they need. Additionally also the education needs of other stakeholders receive attention, including governments, consumers and NGOs. In a complex society in which everything is interrelated, the role of standards becomes more important for them as well.

Education as such is to a large extent a national activity. For that reason, the conference participants get the opportunity to share experiences in setting up national structures for standardization education and national strategies to implement them. Here the complementary responsibilities of industry and their associations, governments, national standards bodies and educational institutions are addressed. In turn, the national level can be supported by the regional level. Initiatives in Asia (Asia Pacific Economic Cooperation) and Europe (European Standardization Organizations and European Union) will be presented and discussed.

Proceedings

Conference participants have been invited to submit papers related to the conference theme or more in general, to education and training about standardization. Most of the papers describe current initiatives on education about standardization in different parts of the world. We expect that this is informative for initiatives in other countries. The last paper, on standardization skills, has another character and reports about an important Japanese study about skills needed for standardization. Interestingly, this paper has the format of a standard. We are grateful to the authors for their efforts in writing and improving the papers and their willingness to share their insights.

The papers have been reviewed. We would like to thank our reviewers: Knut Blind, Donggeun Choi, Tineke Egyedi, Bruce Harding, Wilfried Hesser, Toshiaki Kurokawa, Erik Puskar, Mingshun Song, and Masami Tanaka. Their comments helped to improve the papers. Unfortunately, a few contributions had to be rejected.

We have prepared the conference together with Donggeun Choi (KSA / ICES), Alessia Magliarditi (ITU), Sunghyun Park (KSA / ICES), Erik Puskar (NIST / ICES), Jacques Sheldon (IEC), and Reinhard Weissinger (ISO). We thank them for their support and co-operation.

We trust the conference and this set of papers help to further improve and extend education and training about standardization, for the benefit of business and society.

Hermann Brand (ETSI)

Henk de Vries (Rotterdam School of Management, Erasmus University / ICES)