

The Role of Research and Universities in Standardisation and Regulatory Activities

**MARS Group meeting
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Content:

- Teaching & Training the next generation
- Consultancy/Secondments
- Research

Teaching- examples

EURAS argues that “Standardization is a much neglected topic in higher education”

See: <http://www.euras.org/euras-2>

Joint Working Group on Education about Standardization

Its objectives are to:

- ✓ achieve a significant increase in the number of people who have a fair and positive knowledge of standardization, its characteristics and added value;
- ✓ improve the understanding of the necessity of standardization amongst government officials, business executives and academia;
- ✓ increase the competency of those persons seeking to participate in the standards making process.

<http://www.cen.eu/cen/Services/Education/Educationaboutstandards/Documents/JWG-EaS%20Terms%20of%20Reference.pdf>

Teaching - examples

A leading engineering school from Canada, the **Ecole de technologie supérieure**, won

ISO's Award for Higher Education in Standardization in 2011

(the award is not given every year) for

- The integration of standardization aspects into conventional disciplines such as IT and software engineering. This includes referring extensively to the output of ISO/IEC Joint Technical Committee JTC1, Information technology.
- The inclusion of standards in engineering subjects such as software quality assurance, maintenance and testing by experienced professors who participate in the work of technical committees and subcommittees.
- The publications related to the course (which facilitated its assessment) could serve to provide insights to other institutions wishing to go the same way.

<http://www.iso.org/iso/news.htm?refid=Ref1465>

And also

Middlesex University:

Design for All Regulation, Legislation and Standardisation

- The formal aim of this module is to enable the students who take it to gain an understanding of the relevant national, European and International legislation, regulations and standards which are used to support access to selected ICT requirements and contexts.

Erasmus University College Brussels:

Standardization and Regulation

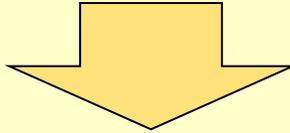
- The aim of this course is to introduce the students to the world of international standardization and regulation.

Supporting materials - an example of ISO

They also :

- Organize (in partnership with IEC and ITU) the World Standards Cooperation academic days.
- Promote cooperation between standards bodies and education institutions in developing countries.
- Contribute to postgraduate courses.

ISO repository of teaching materials



list of existing teaching materials on standardization, with details of the authors and publishers.

http://www.iso.org/iso/home/standards/standards-in-education/education_materials-higher-edu.htm

ISO repository of teaching materials: Examples

➤ **Standardization and business development: The global impact of the IOSA standards and the value of anticipation**

The Operational Safety Audit (IOSA) of IATA, the International Air Transport Association, consists of standards against which the operational, management and control systems on an airline are assessed. This study examines the driving forces for the elaboration of the program.

[more](#) Author(s): David Hodgkinson (The University of Western Australia, Perth, Australia) Publisher: IEC, Geneva, Switzerland

➤ **Architecture-based Approaches to International Standardization and Evolution of Business Models**

The purpose of this paper is to provide a general framework for analyzing the economic impact of international standardization. Based on an analytical framework of product architecture, we seek an economic model that can harmonize the benefit of various entities such as the leading firms.

[more](#) Author(s): Junjiro Shintaku *et al.* (Graduate School of Economics, University of Tokyo, Japan) Publisher: IEC, Geneva, Switzerland

ISO repository of teaching materials: Examples

➤ **The Importance of Standards**

This IEC Lecture Series comprises three lectures:

- (1) Introduction to Standards,
- (2) Life Cycle of Standards, and
- (3) The Economic Value of Standards.

Together they provide a comprehensive introduction to standardization and a useful aid for discussing the key terms, concepts and issues

Author(s): Dr. T.M. Egyedi (Delft University of Technology) Publisher: IEC

➤ **Software Quality Assurance in an Undergraduate Software Engineering Program**

Software tests are used by most organizations. However, many other software quality assurance practices are often neglected. Most developers are not aware of the high cost of inferior quality and its impact on the duration and budget of a project.

At the École de technologie . Laporte, Claude Y. (Ecole de technologie superieure, Canada)

2013 ICES CONFERENCE and WSC ACADEMIC DAY **– *What Does Industry Expect from Standards Education?***

2013 ICES (International Cooperation and Education about Standardization) **CONFERENCE**

12-14 June 2013 at ETSI, Sophia Antipolis, France:

The core theme of the ICES conference:

Industry needs for standardisation education

WSC ACADEMIC DAY 2013

The theme:

Education in standardization for future managers- needs and prospects.

Consultancy/Secondment

- There are a limited number of academics engaged in researching and teaching standards.
- In Europe many of these are linked with EURAS.
- Many are engaged with standards per se.
- But even more important are the number of academics engaged in standards technical committees developing new standards either in their own country or for one of the European Standards Organisations.
- These people are not standards experts per se, they are experts in their discipline.
- They play an important role because unlike other experts attached to committees they are more independent of the specific interests of any one company.

Research

The role of the academics in research is also important.

There are two different types of research:

- 1) Applied research often commissioned by a firm or government agency.
- 2) Research for the academic commons.

In between these two types of research is that commissioned or funded by public funding agencies. A research grant application is often made in response to a general call. In funding such applications attention is typically paid to the quality of “the science” as well as its practical application.

Research

- Research as it relates to standards may not be related to standards at all, but e.g. to food safety, which then gets taken up by a standards committee and is then used as the basis for market surveillance, ensuring that participants in the markets adhere to the standard in question.

Akerlof's Lemons Problem

The need for market surveillance is not just to protect consumers.

- The term „lemons“ is derived from Akerlof's demonstration of the concept of asymmetric information through the example of defective used cars, which are known as lemons in marketplace.
- Asymmetric information arises when the seller knows the true quality of the car. The buyer does not. This inability to differentiate means that cars sell for an average price and this will tend to drive good quality cars from the market.
- Hence this poses problems for the good quality firm.

Akerlof, George A. "The market for" lemons": Quality uncertainty and the market mechanism." *The quarterly journal of economics* (1970): 488-500.

Akerlof's Lemons Problem

- One way round this is of course regulation, with market surveillance to ensure that 'lemons' are not sold on the market place.
- Standards play a critical role here in defining what is an acceptable product and what is not.
- However, Akerlof did not conclude that the lemon problem necessarily implies a role for government. Instead, he pointed out that many free-market institutions can be seen as ways of solving or reducing "lemon problems". One of these is for the sellers of good quality products to signal that they are good quality.

Akerlof's Lemons Problem

- One way firms can signal this is through the adoption of voluntary quality standards such as ISO9000 and ISO14000.
- ISO 9000 was the first of a new breed of standard, a 'generic management standard' designed to help ensure quality within management systems.
- It represents an international consensus on good management practice. It is primarily concerned with quality management
- It is not a guarantee of quality as such, but ISO certification means that an independent auditor has checked the processes influencing quality.

Akerlof's Lemons Problem

- ISO 14000 is similar to ISO9000 but with respect to environmental quality. As we shall see there are other standards which relate to specific areas.
- Firms go to the expense of acquiring certification – and it can be quite expensive. This signals to the consumer that the product is of high quality, because these are management standards indicating that the firm has good standards in place.
- This emphasises that problems of poor quality can be tackled by other means than regulation. But, in many cases these are not sufficient and market surveillance is still needed. In many cases standards such as the ISO family are actually used in market surveillance.

Signalling Problems

- My paper in the Journal of Policy Modelling indicated that these standards are more likely to be obtained by large firms in manufacturing, often with an export focus and based in larger cities.
- How about smaller firms with a domestic focus in the services industry and in rural areas?
- This perhaps suggest that there are limits on the role of the free market to solve the lemons problem and that is why we need government intervention, legal standards and market surveillance as well as voluntary standards.

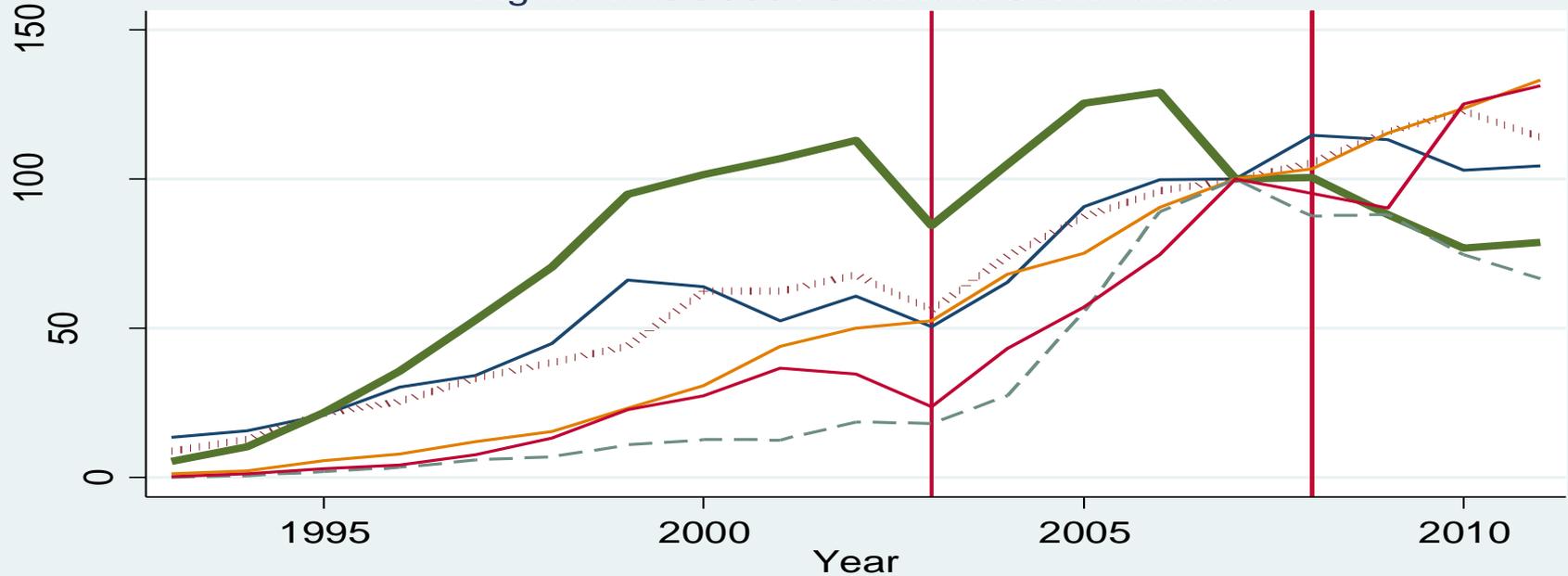
John Hudson and Marta Orviska: "Firms' adoption of international standards: One size fits all?." *Journal of Policy Modeling* 35, no. 2 (2013): 289-306.

EU Standards

- The problem with this is that they tend to be EU standards which are a compromise between what the richer and poorer countries tend to want.
- In addition, there are still differences as standards tend to be implemented by countries and they tend to implement them in different ways.

The Growth of ISO 9001 – declining in North America

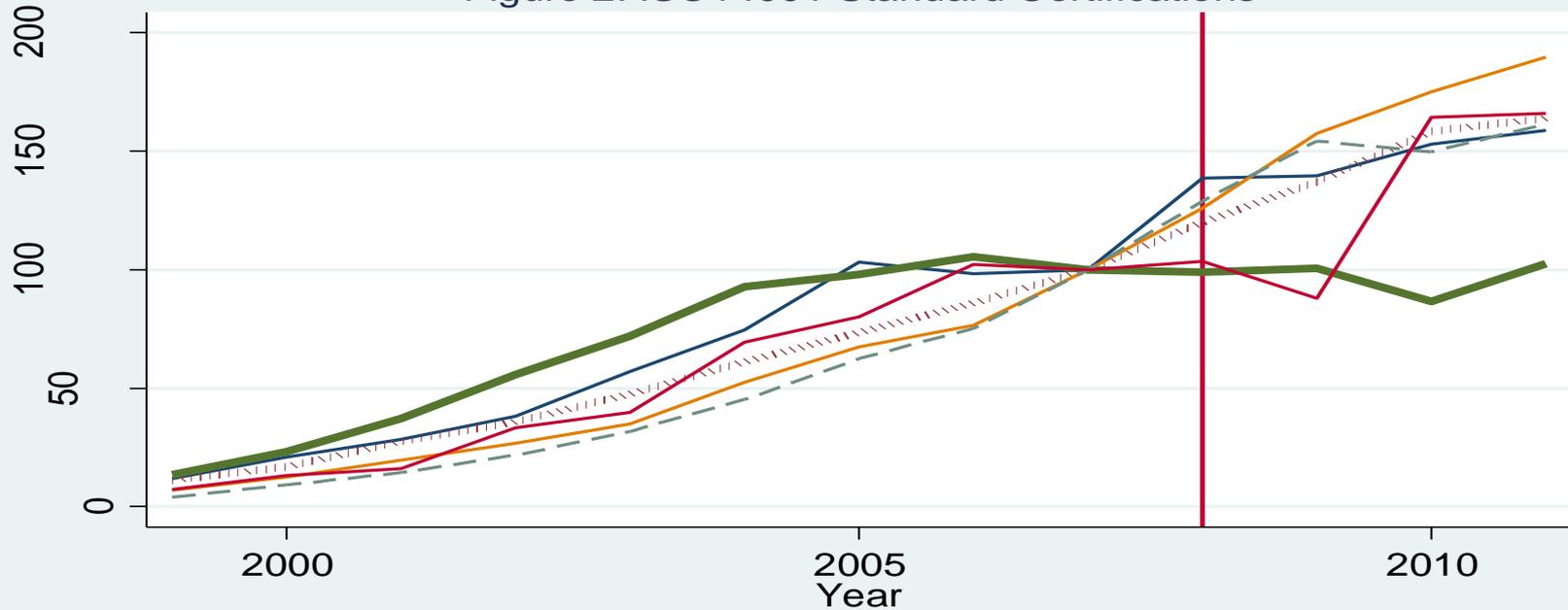
Figure 1: ISO9001 Standard Certifications



all data has been normalised to equal 100 in 2008

The Growth of ISO 14001

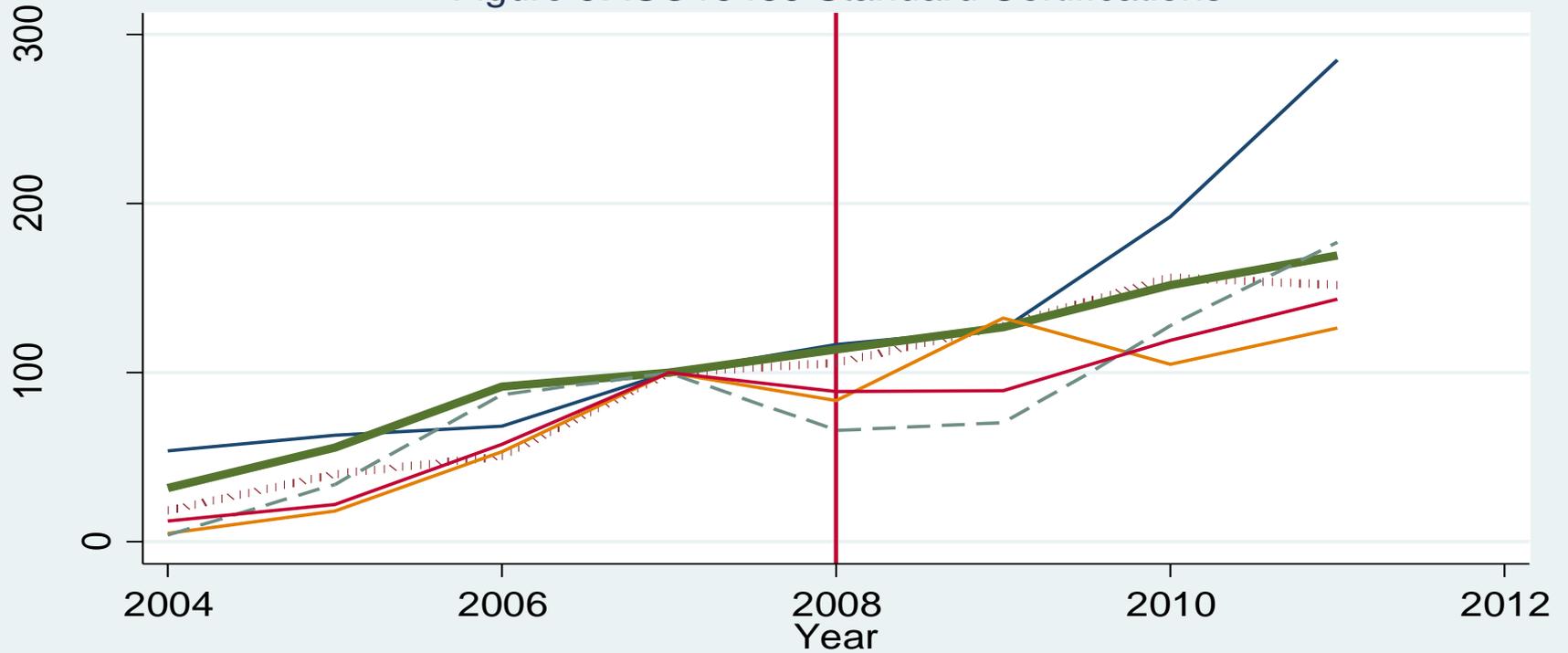
Figure 2: ISO14001 Standard Certifications



all data has been normalised to equal 100 in 2007

ISO13485:

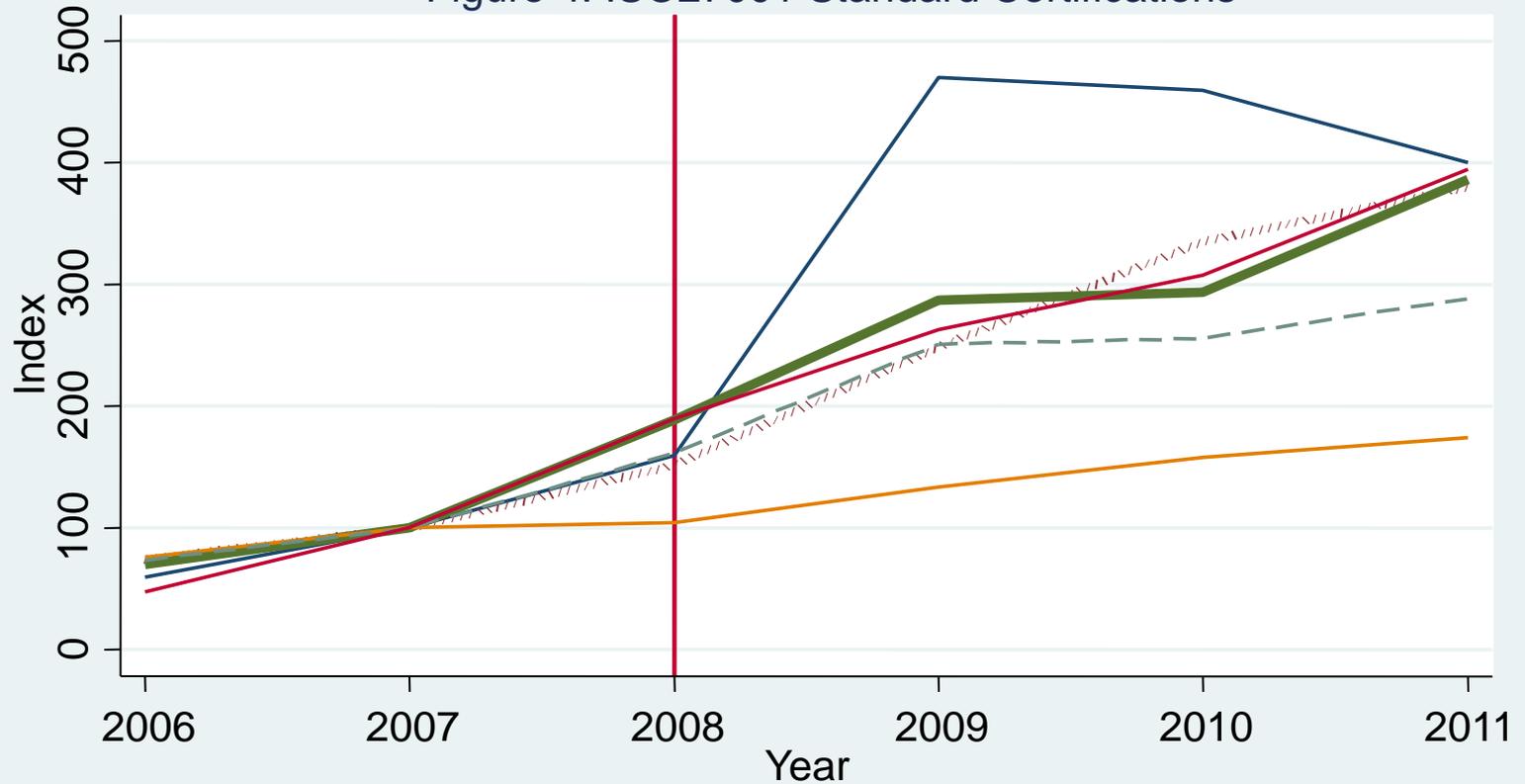
Figure 3: ISO13485 Standard Certifications



all data has been normalised to equal 100 in 2007

ISO27001:

Figure 4: ISO27001 Standard Certifications



all data has been normalised to equal 100 in 2007

Further statistical analysis

- Data suggest that the crisis had a temporary impact on standard certification, particularly for ISO 9001.
- Asia, particularly East Asia, was relatively immune from this, whilst North America (USA) has seen a continual decline in certification in general.

Regression analysis – key findings:

- ✓ larger and richer countries tend to have higher certifications (GDP, GDP per capita),
- ✓ share of exports is not important but both manufacturing share and service sector share of GDP have positive impact on certification
- ✓ certifications have been growing over time (other things being equal),

Here are some more examples of academic research:

Measurement of machinery safety level in the European market: Characterisation of the compliance within the scope of MD98/37/EC

CORDERO, CA; SANZ, JLM; OTERO, JE; GUIJOSA, JMM

SAFETY SCIENCE Volume: 51 Issue: 1 Pages: 273-283 Published: JAN 2013

Abstract:

The aim of this investigation was to setup the procedure to measure the efficiency of market control activities in the European framework. This was carried out by means of analysing the data collected in the last five campaigns of control of industrial products performed yearly by the Safety Machinery Lab (Spain).

The goal of each campaign is to verify whether a particular product falls within the scope of the Machinery Directive. This implies to verify compliance with essential health and safety requirements related to the design and construction of machinery and, to test machine according to related Harmonised Standards.

Here are some more examples of academic research:

A smooth-running market surveillance plan for electrical products

RAJAMAKI, J

EMC 2005: IEEE International Symposium on Electromagnetic Compatibility, Vols 1-3, Proceedings Pages: 1-6 Published: 2005

Abstract:

European industry is becoming more outspoken on the need for improving market surveillance and, in some cases, industry has refused to accept higher product standards if market surveillance is not drastically improved.

This paper examines a model for a well run safety and EMC market surveillance plan. Some key issues, which come up with regard to the new model, are also discussed.

The fundamental objective of this paper is to be a component helping towards better and more effective EU-levels of market surveillance and, in this respect, to improve confidence in the EU single market concept. For non-Europeans, this paper gives an overview of the structure of European requirements for electrical equipment.

Conclusions

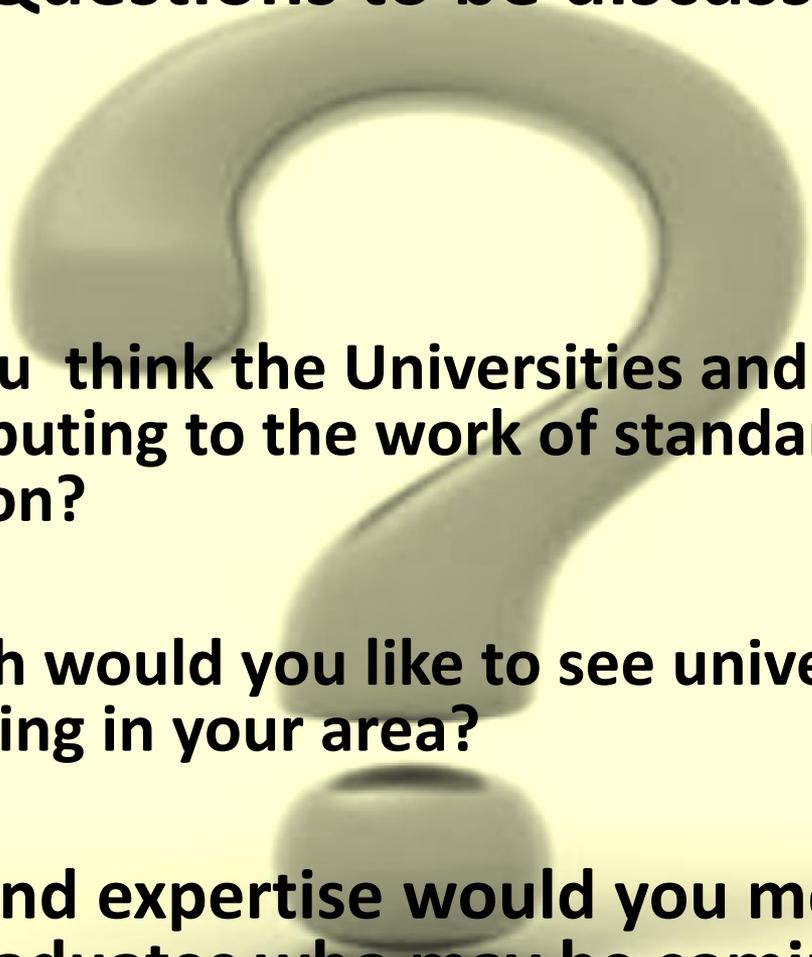
- universities have a lot to offer in both research and training people.
- But perhaps we need to increase the links between the Universities and the users of research.
- In terms of research it is in part to provide high quality research resources, but also to think 'outside the box'. To provide unusual insights about which people are not aware of.

Conclusion

- Universities have the expertise to help industry, government and international agencies. Academics also have the time to analyse long-term issues and trends, often raising new issues or perspectives for discussion. In the case of the economist, the skills relate to an understanding of the way economies work and also the technical skills such as econometrics which allow us to analyse data. Other social scientists bring a different set of skills. Whilst the sciences and engineering can and do help in the production of standards, providing expert input into various committees producing standards.

- But there is sometimes a problem in linking the academic with the user. Academics generally publish their work in journals or books and wait for the results to be appreciated by other academics and also users. But that can take a lot of time. Conferences such as the EURAS and SIIT ones are valuable in bringing academics and users together, but perhaps we need more. Perhaps too academia needs to be quicker in responding to the needs of industry and others in what they teach in training the next generation.

Questions to be discussed



- **What role you think the Universities and academics can play in contributing to the work of standards and standardization?**
- **What research would you like to see universities and academics doing in your area?**
- **What skills and expertise would you most value in university graduates who may be coming to work with you?**

Thank you for your attention.