

Dear Ladies and Gentlemen,

As Secretary General of the European Federation of the National Engineering Associations - FEANI, I am particularly pleased to have the opportunity today to shortly address you. With 3,5 million professional engineers in Europe, our profession is not only an important one in number of practitioners, it is a particular important one in terms of influence and impact on societal issues.

Whether it now relates to global warming, maintaining Europe's competitiveness, innovation, electric cars, solar energy, poverty reduction, sustainable development, global security, environmental degradation, disaster response and so on : everywhere engineers are involved.

Human civilisation is without any doubt irreversibly connected with obtaining control over « mother nature ». This is exactly what an engineer does, this is his (or her) mission : developing and designing methods and technologies, constructing tools and equipment to influence nature and model it according to his wishes. In that sense, one could say that engineers « challenge God » (as opposed to my fellow colleagues-lobbyists in Brussels who represent the doctors, the surgeons or the anesthesists, who believe they “are God”).

Most of the broader history of civilization is also the history of engineering, engineering applications and innovation. From Stone Age, Bronze Age, Iron Age to the Steam Age, the Nuclear Age and the Information Age : all relate to engineering and shaping our interaction with the world. The Stone Age did not end because we ran out of stones, but because mankind developed scientific approaches and methods to the understanding of the natural world and the analysis of practical problems : mathematical representation, structural analysis and design and the replacement of muscle by machines into the production process. The mission of an engineer is to « become better », to ensure « progress in civilization ». That is what we do, that is what we are good at, that is our passion.

Nonetheless, having made the point on how important engineers are in today's society and how important they have been for civilization of mankind in the past, there are two additional elements I would like to focus on and bring to your attention. The first has to do with the ***need for engineers***, the second with ***engineering mobility***.

Although at first glance it may seem that 3,5 million engineers from various disciplines are sufficient to satisfy the growth in and spread of technology across Europe, there are great inequalities in the distribution of those engineers. Today, countries like Germany, Switzerland, Benelux, Austria, Norway, etc. have a shortage of engineers, whereas countries like Spain, Finland, Portugal (and obviously Greece) have too many. How many engineers does a country really need? How many engineers does a country need to produce to keep up with this need? If a country produces more engineers, will that promote development? What types of engineer does a country need to produce and at what levels?

These questions are being asked increasingly urgent by a growing number of people in more and more countries, for different reasons. The problem in response is that these are, in fact, rather complex questions, for which there are no simple or straightforward answers. This is partly and perhaps surprisingly, because of a shortage of statistical data and indicators at European and international level. There are widely broadcast estimates in the media, for example, that the United States only graduates 70.000 engineers a year, compared to 600.000 in China and 350.000 in India but we must ask ourselves if really the same criteria are used in the comparisons, the same fields, types and levels of engineers (e.g. civil, mechanical and electrical engineering), technicians and technologists, academic, professional and consulting engineers, at degree, bachelor, master's or doctoral level? The answer is further complicated by different definitions and understandings of what an engineer actually is. In Germany alone, there are around fifty definitions of an engineer. In many countries the term « engineer » is also used commonly to refer to almost anybody that does anything technical.

Nonetheless, governments and professional engineering bodies around the world, such as FEANI, have identified and emphasized the actual and impending shortage of engineers as an international priority. Because of this « universal lack of adequate engineering capacity », it is important to attract the interest of parents, career advisors as well as young people, to raise the status of the engineering profession.

We not only need more engineers, we also need more *mobile* engineers. Today, we are faced with global challenges which are not restricted to Europe alone. The demand is increasing, also from industry and elsewhere, for engineers who are able to work anywhere in the world and who can work on global engineering projects and problems. Engineers must not only be multi-skilled and multi-disciplined (not purely scientific and technological skills), but also be multi-lingual and multi-cultural (sharing views with people from other cultures, interactions with various stakeholders, engage in« thought »-mobility and nurture mental flexibility). Mobility is more and more becoming a key professional development factor for any professional who wants to find interesting work and good conditions of employment. Mobility of manpower – of professional competences and resources – is furthermore crucial for any company or organization that has to compete in a global market. Therefore, professional mobility is also a key element for furthering your career. There is no correct answer to the question how many times an engineer should change jobs in his life time, but that he will is very, very likely.

We are not running out of challenges. The lack of STEM-skilled labour will be one of the main obstacles to economic growth in the coming years. The good news is that there is not a lack of ideas and creativity on how to improve the alarming situation, especially not from business. Companies across the EU have taken actions in order to increase the supply of STEM-skilled workers to European labour markets. By involving in primary and secondary education and by providing a context for science subjects, the interest for such educations has increased. However, companies cannot do this alone. A stronger commitment and more joint efforts are needed from a broad range of stakeholders including governments and education providers at all levels. The action list for national governments includes re-orienting resources to STEM education, raising the

attractiveness of such education by improving their quality and relevance, setting the right conditions for collaboration between business and education providers and attracting STEM-skilled workers from abroad. Moreover, the potential for EU-level cooperation could be better exploited, through intelligent use of programmes and instruments. With the Engineering Card we believe as FEANI to have created such an instrument which will facilitate the mobility of engineers in the European Single Market. It has the size of an identity card or a credit-card and includes a reference to an internet platform where copies of the degrees, diploma's and certificates of the card holder, as well as his professional references and endeavours in continued professional education, can be retrieved within seconds. We are glad that Portugal with the Ordem dos Engenheiros has today engaged in this project, together with 8 other European countries. Yet, this mobility also has its price : today Spanish, Greek and Portugues engineers move to Germany, Scandinavia, Brazil whereas the cost of training and educating an engineer in those home countries amounts to EUR 80.000,-. The support they are receiving in the host country to facilitate their integration and social life, amounts to another EUR 50.000,-. There is a risk of brain-drain in those countries currently exporting their engineers and let us not forget that today, on average, in Europe, 28% of graduate engineers, also work in a profession other than engineering : they work in sales, finances, human resources, etc. which indicates their great labour market flexibility.

Yet, virtually anywhere in Europe we should also promote engineering education to the female population. On average only every sixth engineer in Europe is female, with exceptions in countries like Latvia and Bulgaria where they account for around 30%, or the UK where they only represent 9% of the total number of engineers.

In any case, we must be proud to be or to become an engineering professional. We will have a direct important impact and a strong responsibility in our society. Engineers make the future and must continue to challenge the nature of things. An engineering degree at graduation time should not be considered as an end, but as a new beginning. We must stay hungry and curious, engage in continuous professional development (CPD), be aware of a broad competitive environment, travel abroad and learn foreign languages, stay in touch with

each other and learn from each other's expertise, no matter what discipline we have specialized in. We must multiply our knowledge, interact and disseminate our ideas.

I am glad that the Ordem is joining us today in our effort to facilitate the mobility of engineers and I thank you very much, indeed, for your attention.