Project Title: **Innovating Education of Talents in Chemistry for Business Success in SMEs' Innovations - InnoChem**

Output Title: **Status Quo Analysis – Czech Republic 2016**

Activity Code: **O2**

Authors: **Ladislav Novák, Jiří Reiss, Jan Kvarda, Ivo Stanček, Ladislav Špaček, Vladimír Kočí, Jana Petrů, Jana Juklíčková, Pavel Šimáček, Daniel Maxa**

Tasks:

The national teams with support of EPC will carry out comparative analysis of the existing curricula in the country and the needs of industry, especially SMEs, to enhance their creativity and develop cutting edge innovations, as well as the available best practice and know-how, including recommendations developed in a follow-up of the Cefic study "Critical Skills needs for Innovations in the Chemical Industry". As this study was based on the needs of large chemical companies, its analyses and conclusions need to be extrapolated to SMEs in their efforts to respond to emerging investment opportunities for globally competitive innovations. The Status Quo Analysis will identify the set of competences (skills and knowledge) to be addressed in the enhanced and potential barriers to introducing new curricula and cooperation companies in practical part of the study.

The present SQA Czech Republic 2016 report is the result of the current state of education level at technical universities mapping and needs of the industry in improving the employability of university graduates in innovative chemical industry and thus competitiveness of Czech industrial production. From the available literature and analyzes carried out in the framework of activities and projects was compiled list of pros and cons and potential pitfalls in raising the quality of higher education and consequent success of

graduates in technical fields, space is devoted to the current demands of industry and related fields such as potential employers of graduates with bachelor and master's degree. It is also designed for an improvement of relations between the industrial and scientific spheres and to promote their communication. This document presents an outline of both potential solutions & risks or negative aspects of this process.

Contents

1 Characterization of the chemical sector in the country and the role of SMEs in innovations

For the chemical industry in the Czech Republic it is typical the following paradox: the industry belongs according to sales and number of employees among the most important, it has a tradition, innovation and good scientific research background. However, it is struggling with a strong regulation (mainly from the EU) and with a negative image of chemistry as such. The chemical industry is specific also by “not targeting end users”, but mostly directing products into downstream sectors, such as plastics, automotive, electronics, construction, food industry and others.

Currently, there is a large space for highly innovative small and medium businesses to link science and research with industry in order to apply high added value - Qualified chemistry (nanotechnology, nanomaterials, chemicals based on natural substances, etc.).

The chemical industry in the Czech Republic includes a wide range of technologies and supplies variety of products. High volume technologies produce inorganic chemistry e.g. ammonia, nitrogen, sodium hydroxide, sulfuric acid or nitric acid. Petrochemical industry except fuels produced e.g. ethylene, propylene, benzene, styrene, and many other organic substances. Agrochemical companies produce fertilizers, insecticides, herbicides etc. Plastic industry offers e.g. polyethylene, polyesters, polyisoprene, neoprene, polyurethane, polystyrene, etc. Specialized chemical plants are producing explosives and components thereof (e.g. nitroglycerin, nitrocellulose, ammonium nitrate), food additives (e.g. vanillin, citric acid), or cosmetic components (parabens, stearic acid etc.). Nevertheless, the Czech Republic’s chemical industry has more imports than exports. It has a negative balance throughout the observed period.

The chemical industry is an important area of industry, particularly in terms of its position as a producer of inputs into other areas of industry or agricultural production. The share of the chemical industry on employment, financial results and other important economic characteristics is between 2-4 percent. Added value per employee and the average monthly wage is higher than in the industry average in chemical companies. Czech Republic belongs among the clean importers of chemical products and the share of foreign trade among the EU-27 countries is very small. Companies in the chemical industry are reaching very good financial’s analysis ratios.

The chemical industry is in the Czech Republic is among the top 3 in terms of both revenues and number of employed people. SMEs constitute over 96 % of all subjects in the Czech Republic's industry in general and the chemical industry is no exception. In the chemical industry in particular, the big players cannot exist without cooperation with small (SMEs) and vice versa. The chemical industry is able to bring solutions for coming challenges (enough energy, food and drinking water for 9 billion people sometime in 2050).

2 Product innovation trends and their perspectives in the country

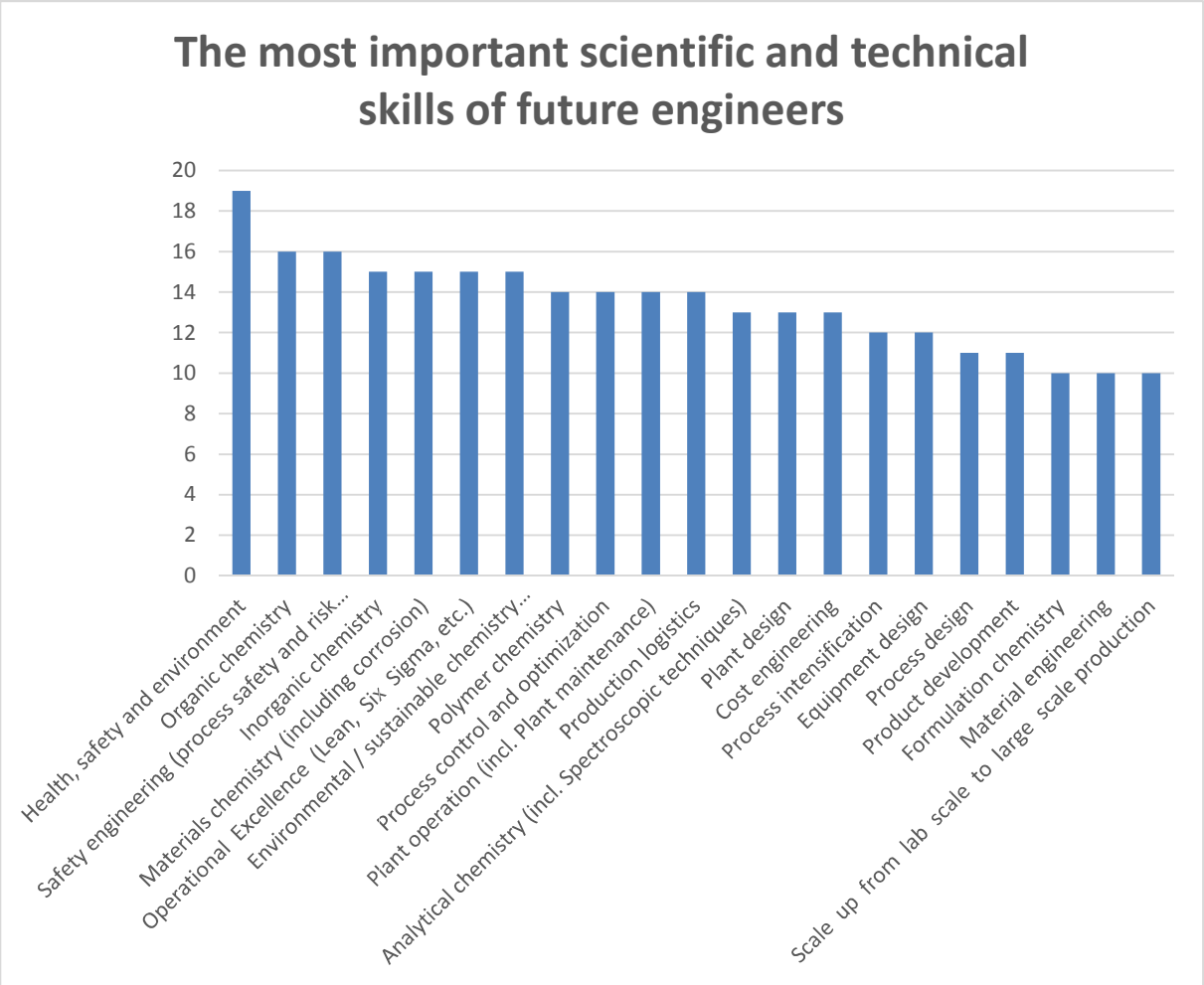
Czech chemical industry competitiveness lags behind matured markets, both within the EU and beyond. Even though, thanks to an entry of foreign capital and ongoing restructuring the industry is gradually improving, but the dynamics of innovation activity is still rather low, technologically demanding and specialized products are often imported from abroad. To maintain cost competitiveness will be increasingly difficult due to rising input prices, including the price of labor.

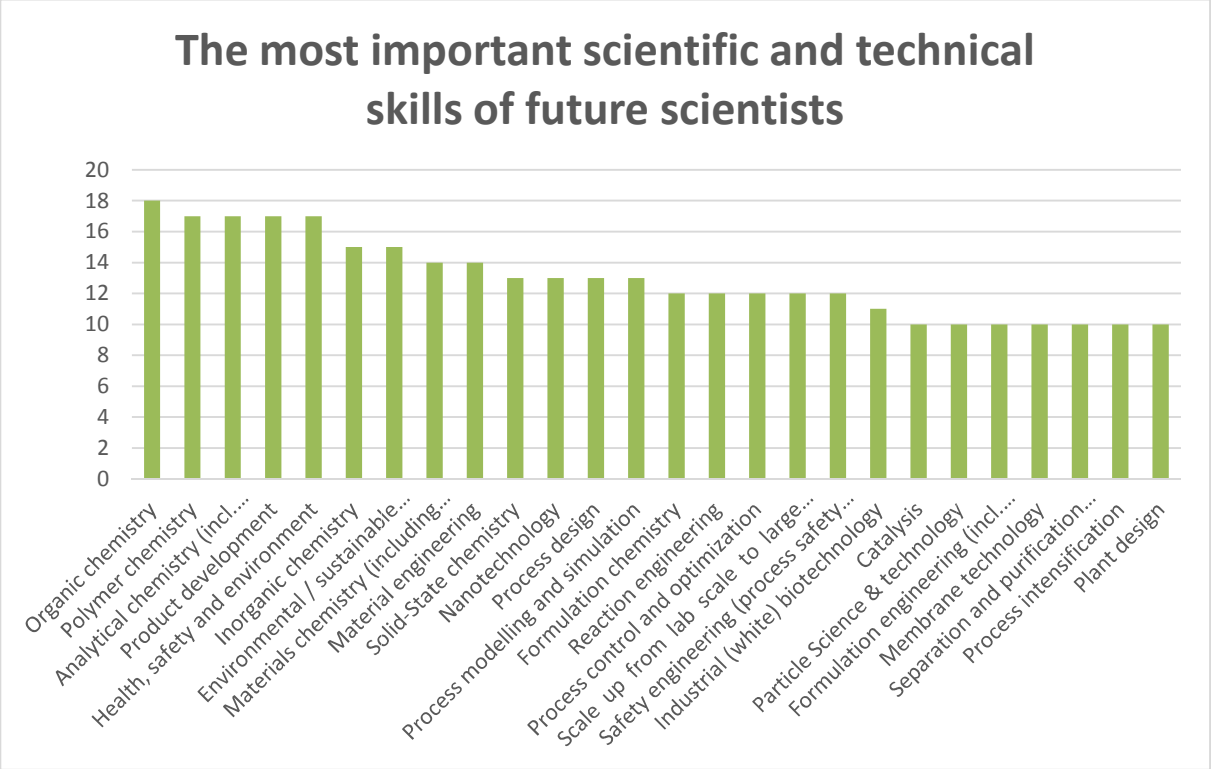
In terms of human resources the major factor becomes environmental protection legislation. Manufacture of chemicals and paintings are very demanding in terms of EP and even the products themselves are subject of handling in a special regime. Ecological behavior of companies and end users is improving, and therefore innovation is extremely important and works competitiveness tool and a sign of manufacturers' prestige in this sector. Competition in the market will tend to intensify, increasing the demand for labors in a commerce and customer service, which play a decisive role in the sale of manufactured goods. Meaning of manufacturing positions will tend to decrease slightly. Enterprises will seek for cost savings and some vacant positions will not be engaged. Conversely, growing markets east from the Czech Republic will stimulate Czech manufacturers to pursue foreign investments (building trade offices or branches and production plants). This will again influence a demand for marketing management positions and for technological positions in particular. Generally, in this segment the required quality and reasonable cost will become an issue, not an introduction of new products.

Innovation aims at the area of new materials (nanotechnology, nanomaterials and biotechnology) and streamlining of chemical processes in the Czech chemical industry. In addition to the research of new chemical compounds, it is also the area of energy savings. The chemical industry is currently one of the most innovative sectors. The main philosophy of innovation in the chemical industry is to maintain competitiveness and sustainability, as well as increase environmental responsibility.

3 The critical skills needs for innovations with particular emphasis on development of SMEs (Output from received questionnaires from SMEs)

(in the questionnaire survey corresponded 11 respondents)




The most important scientific and technical skills of future scientists
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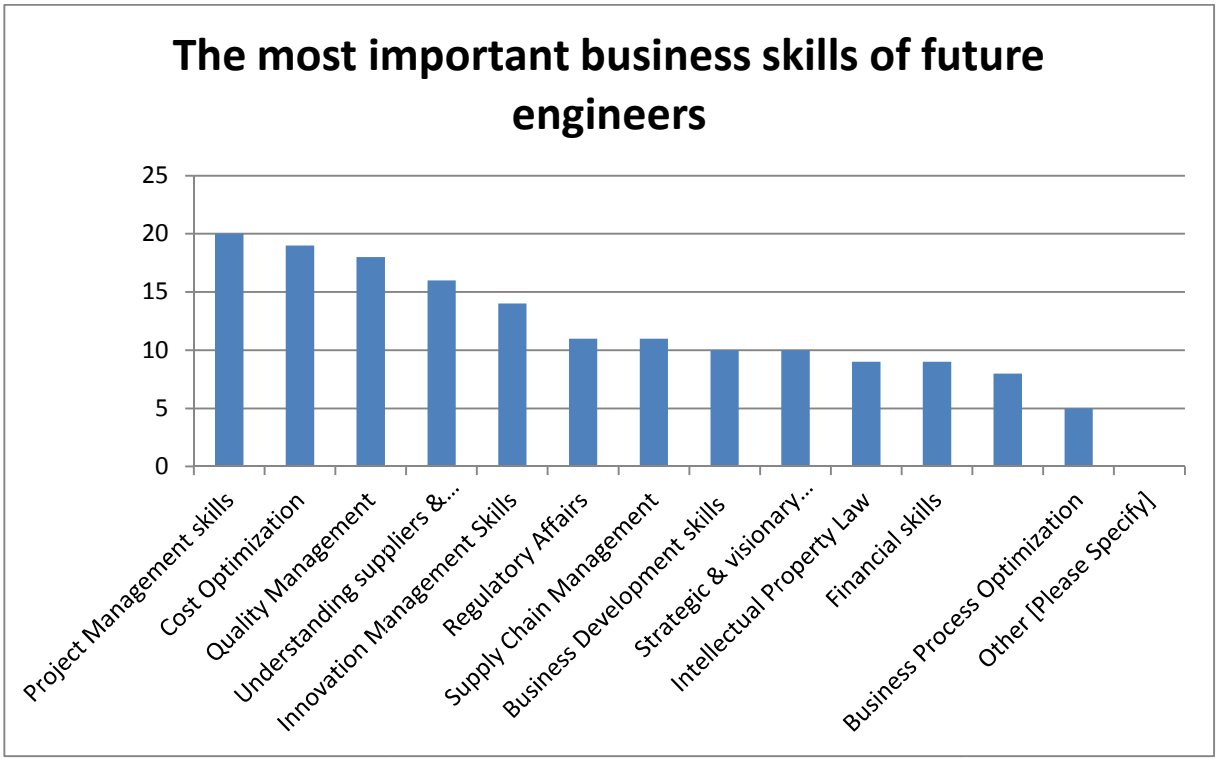
Organic chemistry
Polymer chemistry
Analytical chemistry (incl....
Product development
Health, safety and environment
Inorganic chemistry
Environmental / sustainable...
Materials chemistry (including...
Material engineering
Solid-State chemistry
Nanotechnology
Process design
Process modelling and simulation
Formulation chemistry
Reaction engineering
Process control and optimization
Scale up from lab scale to large...
Safety engineering (process safety...
Industrial (white) biotechnology
Catalysis
Particle Science & technology
Formulation engineering (incl....
Membrane technology
Separation and purification...
Process intensification
Plant design


The most important business skills of future engineers
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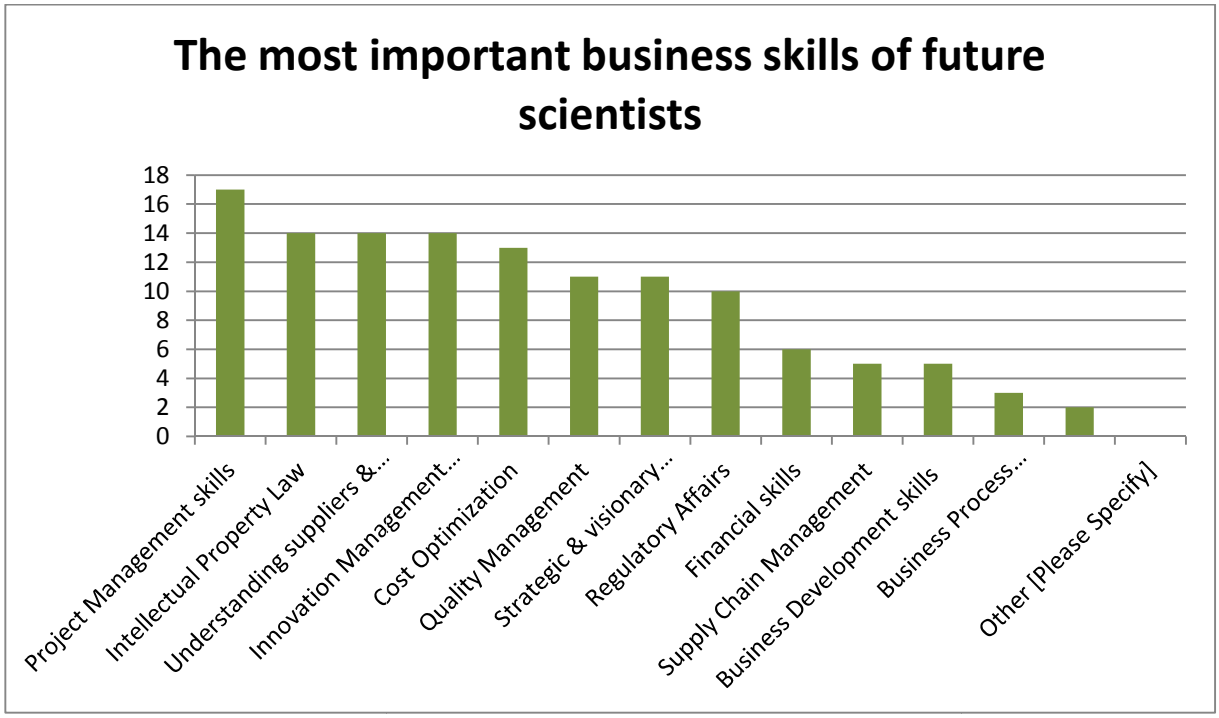
Project Management skills
Cost Optimization
Quality Management
Understanding suppliers &...
Innovation Management Skills
Regulatory Affairs
Supply Chain Management
Business Development skills
Strategic & visionary...
Intellectual Property Law
Financial skills
Business Process Optimization
Other [Please Specify]


The most important business skills of future scientists
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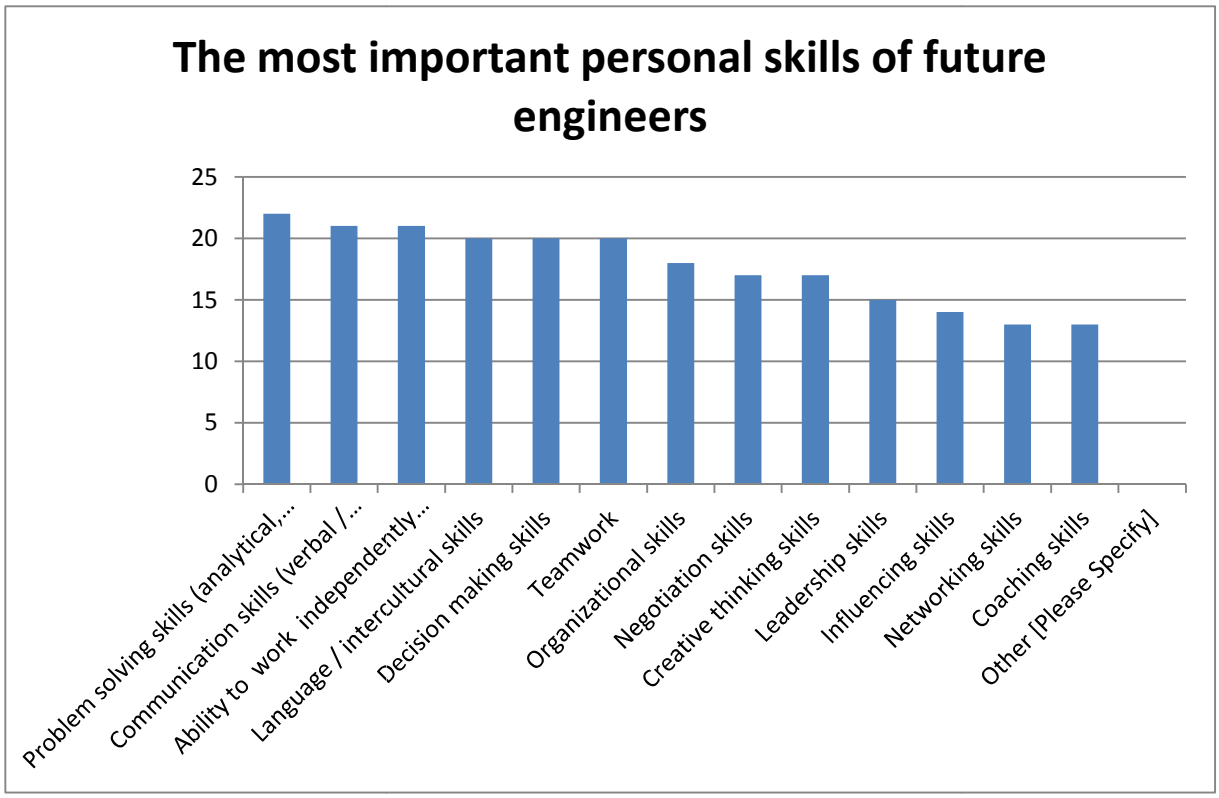
Project Management skills
Intellectual Property Law
Understanding suppliers &...
Innovation Management...
Cost Optimization
Quality Management
Strategic & visionary...
Regulatory Affairs
Financial skills
Supply Chain Management
Business Development skills
Business Process...
Other [Please Specify]


The most important personal skills of future engineers
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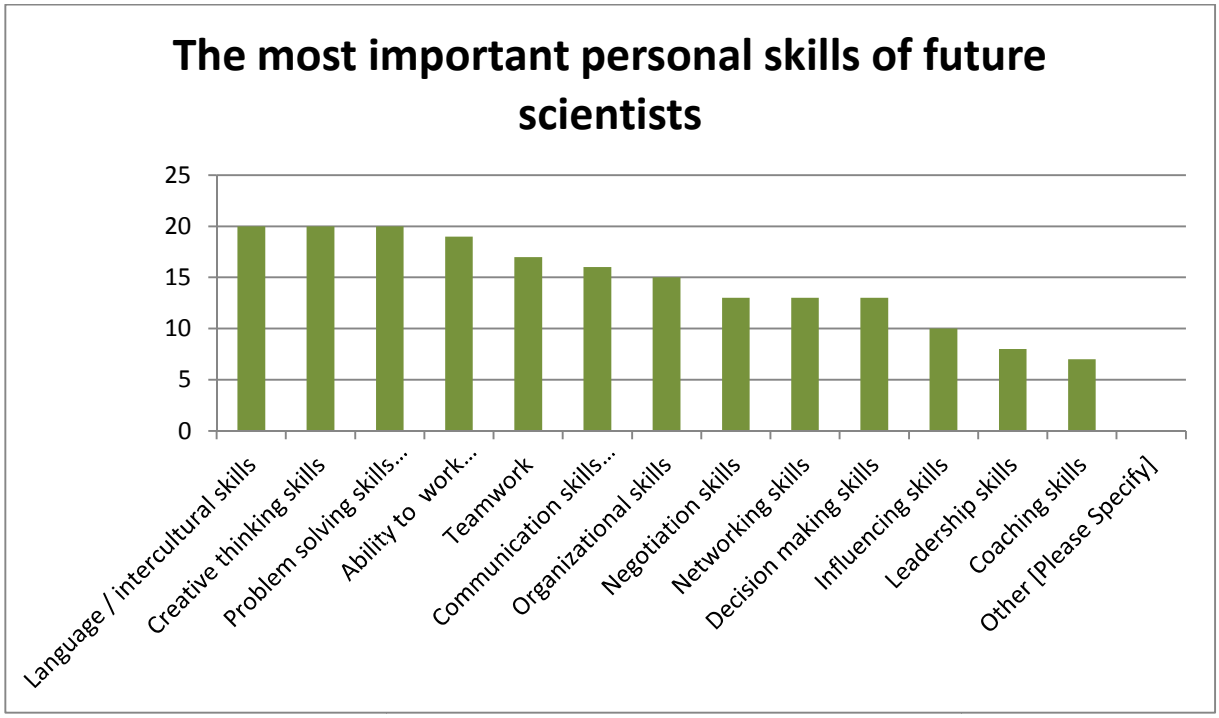
Problem solving skills (analytical,...
Communication skills (verbal /...
Ability to work independently...
Language / intercultural skills
Decision making skills
Teamwork
Organizational skills
Negotiation skills
Creative thinking skills
Leadership skills
Influencing skills
Networking skills
Coaching skills
Other [Please Specify]



Five most important criteria – the most commonly rated

Set of scientific and technical skills

Engineers

- Inorganic chemistry
- Organic chemistry
- Polymer chemistry
- Process control and optimization
- Production logistics

Scientists

- Inorganic chemistry
- Organic chemistry
- Polymer chemistry
- Analytical chemistry (incl. Spectroscopic techniques)
- Process design
- Product development

Set of business skills

Engineers

- Quality Management
- Understanding suppliers & customers
- Project Management skills
- Cost Optimization
- Innovation Management Skills

Scientists

- Intellectual Property Law
- Understanding suppliers & customers
- Project Management skills
- Innovation Management Skills

Set of personal skills

Engineers

- Communication skills (verbal / written)
- Problem solving skills (analytical, reasoning)
- Decision making skills
- Ability to work independently (self-management)
- Teamwork
- Organizational skills

Scientists

- Language / intercultural skills
- Creative thinking skills
- Problem solving skills (analytical, reasoning)
- Ability to work independently (self-management)
- Teamwork

4 State of affairs in current education of scientists

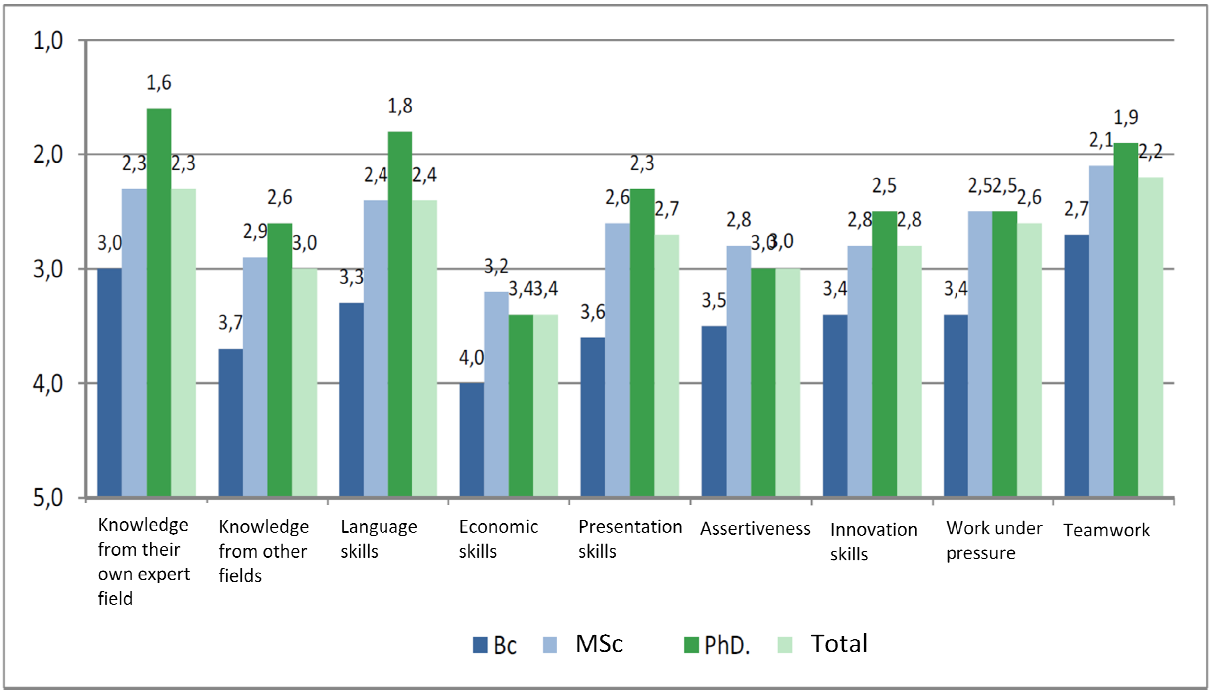
Czech technical universities are built based on a long term tradition. They occupy the top ranking among the world's best universities and offer a wide range of fields of a full-time and part-time studies. In 2015 five Czech universities: The Charles University in Prague, Masaryk University, The Czech Technical University in Prague, Palacký University Olomouc and the

University of Chemistry and Technology in Prague, have been listed within “The Center for World University Rankings”. Weaknesses are: too theoretical educational focus, lack of cooperation with practice, weak inter-faculty cooperation and promotion of a low degree programs.

The problem of a higher education is primarily the deteriorating quality of candidates for technical studies, loss of talented students and declining interest in technical fields. The general lack of candidates is related not only to a decline in the demographic curve, but also to a desire of candidates to study particular subjects easier. Certain ways may be a better promotion of science at secondary or primary schools already.

During university studies, students improve themselves not only in expert knowledge, but also in language skills and are encouraged to gain experience at foreign fellowships programs. On the other hand, there is a lack of long-term mobility in doctoral programs (as well as academic staff), there is lack of cooperation with foreign companies, where students can find a job.

According to a questionnaire survey from 2009 carried out under the project OPVK (Fig. 1) there was assessed the level of graduates who successfully passed a competition of industrial enterprises. The best evaluated skills of graduates on average basis were knowledge from their own expert field and the teamwork. Then the worst were economic knowledge, skills and assertiveness from related expert fields. There is not much focus on the economic skills and assertiveness on employers’ side, but level of knowledge was found relatively low among graduates. Weight of the knowledge from related fields is already higher, while the insufficient level of graduates in this field is quite strong.



Pict. 1: To what extent graduates meet the demands of employers (1=fully, 5= not at all)

Source: NVF-NOZV: Employee research 2009

According to an article on the Student Media Ltd. website, which is based on a survey of the Swedish company Universum in the Czech Republic, Czech graduates seek for a prestigious universities and a strong employer who offers them a secure and stable job, a creative environment and plenty of free time. The most important criteria is the balance between work and personal life called "Work-life balance" and the second most important goal is to secure and stabilize an employment. Regarding the criteria of ideal employers, the most important criteria is a good work atmosphere and then an actual job description and remuneration. In the job description graduates are particularly interested in the possibility of professional training, skills development and stability of employment.

Employability of graduates from technical universities, especially those of high-quality universities with a good reputation, it is still good, it is supported by events with potential employers' organizations and job fairs. However, there are also many disciplines, although entitled attractive for new students, but with a low applicability. This leads to oversizing of certain sectors and thereby decreases chances on the labor market. For possible amendments, there is lack of feedback from alumni and from their employers. There is still lack of interest in cooperation with the universities in the commercial sphere and lack of graduates from bachelor degree courses.

It is interesting that although in technical fields such as engineering, chemistry and electrical engineering employers increasingly declare a gradual loss of experienced professionals and therefore an interest in new workers from the ranks of graduates recently, they are often unable to create appropriate conditions that would compete with companies focused on trade and other fields.

5 Support of stakeholders (particularly relevant authorities and institutions) needed for innovating tertiary education of scientists to include the critical skills identified

5.1 Accreditation, certification and other obligations arising from applicable laws for introducing innovating curricula

According to the Act no. 111/ 1998 Coll. on universities each study program is subject to accreditation awarded by the Ministry (Ministry of Education). Ministry progresses request of the Accreditation Committee, which must consider the request within 120 days from its receipt. Content of the application must comply with Decree no. 42/199 Coll.

The written request includes a number of documents, such as documents on personnel, financial, material, technical, information support program of study for a standard duration and details of the Study program. It is also necessary to draw up a development plan for the study program, its rationale and the expected number of students to be admitted etc. When

assessing the application for accreditation of a study program, it is governed by the so-called Accreditation Commission standards, which according to the Commission characterize the general minimum requirements necessary to discuss the request. Studies must be in accordance with the relevant internal regulations of the college. When preparing an accreditation of the new study program there must be a substantial content overlap with the study program, which has been already accredited. The new focus can be done within existing programs as elective courses. It is also necessary to prevent fragmentation of the structure of programs.

Staffing study program shall be sufficient. This must be reflected in the composition of the academic community, which must prevail academics who have a high school contract of employment. It is taken into account, whether there is a sufficient number of qualified academic staff with appropriate publications at school over the past five years. It is assessed whether the profiling subjects are taught primarily by academic staff with at least a scientific degree or academic degree, while 40 % lectures bachelor's degree program and 60% of the lectures Master's degree program must be taught by professors or associate professors with a respective expertise.

University must also be a solver of external research projects that are technically subject to a Bachelor and Master's degree program for which accreditation is sought. It is also assumed participation of students in research activities.

5.2 Time-line for introducing innovating curricula respecting deadlines and legal

Proposal for a submission (i.e. not the final version of the application) to extension and renewing the accreditation is presented to the Rector by a faculty dean only after the statement of the Academic Senate and the approval of the Academic Council. Along with discussing the draft request the Scientific Board of the faculty evaluates the proposal to mandate or appeal the guarantor of the study program and professional guarantor. In case

that draft request is granting accreditation to a new doctoral degree program or in case of an extension of the existing doctoral program to a new study program, the Scientific Board of the faculty also expresses the proposal for the appointment of members of the departmental board at the same time.

Rector forwards the request to the Ministry within four months after receiving a request from the faculty. This period does not include a time during which they were troubleshooting and the period during which the faculty was preparing the final version of the request for the Accreditation Commission. Application for a renewal of accreditation is at the request of the Accreditation Commission communicated to the Ministry not later than six months before the expiration date.

The Accreditation Commission shall examine the request within four monthsafter receiving the application (Act no. 111/1998 Coll., § 79, paragraph 2). Result of evaluation of the application is published in the report of the Accreditation Commission for approximately 14 days after the meeting. If discrepancies are found within the application (missing or erroneous data) the Accreditation Commission interrupts the examination of the application (Act no. 111/1998 Coll., § 79, paragraph 3) and indicates their objections in the record.

Ministry decides within 30 days after receiving the opinion of the Accreditation Commission on granting accreditation (Act no. 111/1998 Coll., § 79, paragraph 4). Ministry's decision on granting, renewal or extension of accreditation will enter into its force after 15 days from the date of delivery (Act no. 111/1998 Coll., § 105, and Act no. 500/2004 Coll., § 152, para. 1, the Administrative Code, be within 15 days of its receipt to file appeal against that decision).

The accreditation process takes approximately eight months from the date of transmission of a draft request to the Rector of the university. The time necessary for the accreditation process must be taken into account when announcing the admissions process. If the study program/ field of accreditation expires in a given calendar year, there cannot be announced admissions for the academic year beginning in the following calendar year

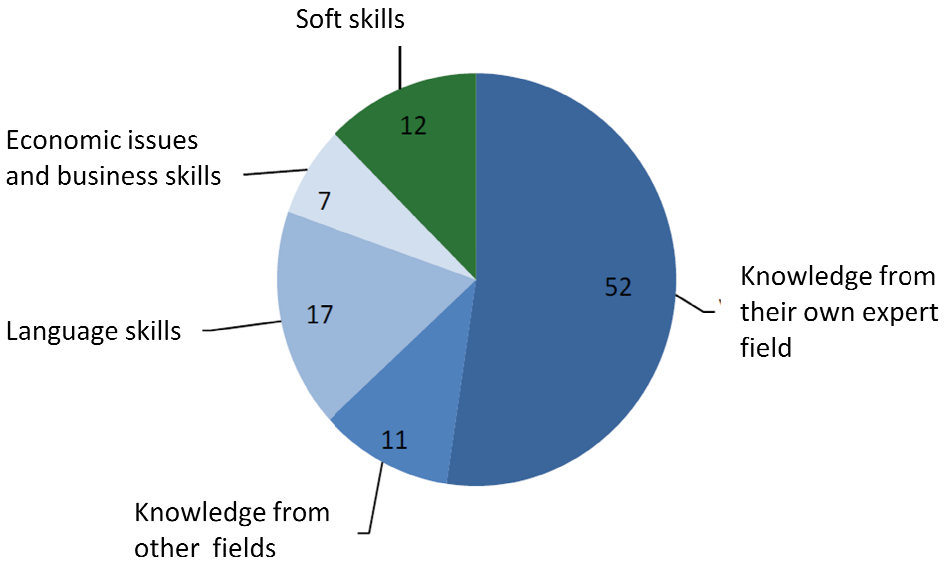
Study program accreditation is granted for a maximum period of ten years (Act no. 111/1998 Coll., § 80). If a degree program is not accredited, admit of any applicants, holding classes, examinations or award academic degrees are prohibited.

5.3 Support of industry needed, particularly in promoting vocational training through stage or other form of practical experience

A competitive chemical industry needs educated, knowledgeable staff at all levels. Graduates of bachelor degree apply for the lower positions, graduates of engineering studies are eligible for higher technical positions and PhD graduates will apply not only for research but also for a senior management positions. Demand for chemical specialists is enormous and it is not limited in the chemical industry yet. For example, chemical engineers are interested in automotive, plastics, food industry and also in the pharmaceutical industry.

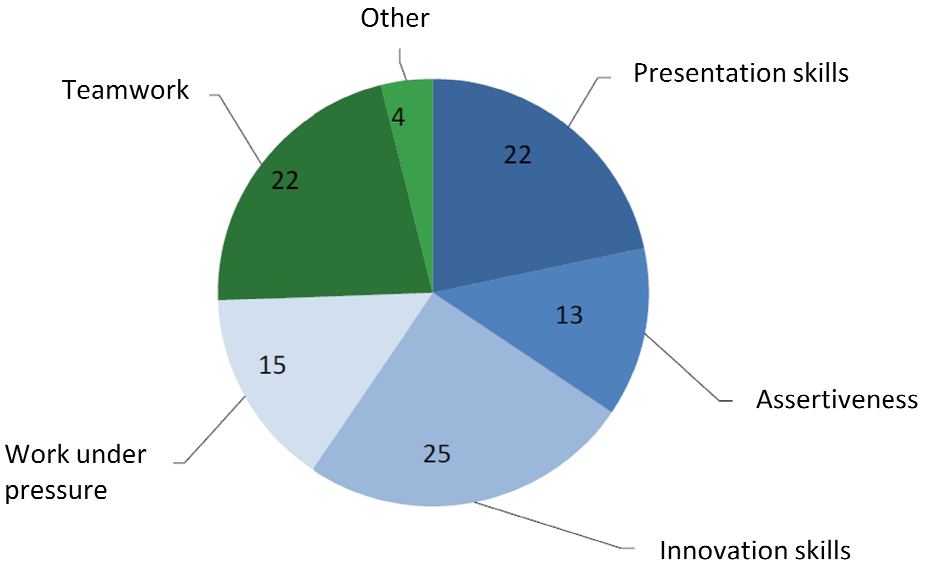
Companies require a highly specific knowledge in chemistry and in addition, an extensive knowledge of European standards, it would entail knowledge of English and German and moreover demands on soft skills - the reliability, accuracy, independence, communication skills (must agree not only with customers).

There is lack of feedback from the industry in terms of what graduates should know from university. Flexible communication between universities and industry could improve the preparation of study programs and preparation of graduates which gives students better chances on the labor market. Questionnaire survey of r. 2009 carried out under the project OPVK forms an idea of the main industry demands for future employee structure and soft skills (Figs. 2 and 3), but these results may not correspond with the current state after so many years after its implementation.



Source: NVF-NOZV: Employee research 2009

Pict. 2: The structure of knowledge and skills of university graduates required



Source: NVF-NOZV: Employee research 2009

Pict. 3: The structure of soft skills of university graduates required

An important point of change in the system of technical education is a closer cooperation with industry and involvement of practitioners. It could attract university environment to create exciting career opportunities within research centers build by universities. Industrial enterprises should create space for student internships, which would become a compulsory part of training of graduates from technical universities. The industry may contribute to increasing of qualifications of academic staff in their workplace, for example, placements in enterprises and support their own research programs.

Industry sees a potential of inexpensive source of information and "know-how opportunities in students' practices":

should become a compulsory part of study

should be concluded with a written report

deepening the scientific and research cooperation between universities and industry

The most fundamental problem is probably still declining students' interest in technical fields and low level of applicants, which can be improved, for example by emphasizing the regional importance of universities and the use of industrial potential of the region, both through the involvement of experts in the education system and the creation of positions for trainees directly to industrial workplaces or "shading" of industrial workers.

Universities have a great potential in research and flexibility to respond to specific orders from the industry, however, they fail to adequately promote these services. Despite the reputation, a long tradition of higher education and active membership in professional organizations and technology platforms, the relationships with industrial partners remains rather on the basis of personal contacts of individual academics. Support of the contract research is centralized, which makes it difficult for those interested in the cooperation with a university, especially to find experts for specific areas of cooperation.

A major limiting factor for the development of industrial cooperation is that this type of activity often does not generate publications or other outputs in the RIV, which reduces the incentive to work already very busy active academics. To develop cooperation instability does not help public and state administration and fragmented and uncoordinated activities of organizational units of the university.

Cooperation is also complicated by the process of globalization; ownership of a large part of companies outside the Czech Republic, where is also being implemented corporate research and cooperation (outside Czech Republic), if not publicly funded, there is a little interest. Another risk efforts may be the reluctance of businesses to innovate production.

5.4 Cooperation of stakeholders needed for promoting entrepreneurship of students through start-ups and spin-offs

Creating conditions for using the results of applied research and innovation is part of a long-term strategy for higher education R & D in recent years. Universities in the Czech Republic repeatedly declared their will to support entrepreneurship in the academic environment and the transfer of knowledge from the sphere of applied research into practice and its commercialization through spin-off companies, including support of intellectual property protection, licensing, etc.

There are established workplaces and centers focused on technology transfer, organizing lectures and trainings with focus on innovation and application of research results in practice. Also in this area there is is undergoing an extensive international cooperation.

Nevertheless, the results of research and development in the technical field, in fact, are implemented almost exclusively through contract research on the basis of bilateral cooperation between universities and external companies. If you have been involved with plans for the establishment of spin-off companies, the vast majority of these projects will not have a great life. In a large number of cases projects with a small development potential were involved.

It appears that the main obstacles to the transfer of knowledge through entrepreneurship students in start-up and spin-off projects include complicated and time consuming process of intellectual property protection, as well as legally and organizationally demanding process of creating spin-off companies. Moreover, it appears that legislation in CR, eventually in EU, as well as the possibility of exercise a power of state universities and research organizations are significantly more complex than in similar cases at American universities, which are given as examples of successful knowledge transfer.

6 Administrative procedures and time-line for implementing a new curricula

In accordance with Decree no. 42/1999 Coll., On the content of the application for accreditation of the study program, as it is clear from the amendments made by Decree no. 312/2011 Coll., The application for accreditation, extension of accreditation for bachelor's or master's degree programs (hereinafter "SP"), or extend the accreditation of SP field of study, form of study, etc., sent in one written copy and in electronic form to the Ministry of Education, Youth and Sports (hereinafter the "Ministry").

When it comes to accreditation under § 81 of the Higher Education Act, it is necessary to present an agreement on cooperation in the implementation of the program in the annex.

In case of extension of accreditation it is given access to a published bachelor's work, diploma or rigorous work, in which the defense had taken place, including the opponents' and recording the progress and outcome of the defense (if they are working in accordance with § 47b of the Act the Higher Education published).

7 Obstacles to innovating curricula for tertiary education

Increasing university graduates carrier prospects may be supported by innovation programs. The inclusion of new elective courses using the new knowledge of science and research can lead to an innovation, as well as to a compliance with the requirements of practice. The crucial innovation's benefits to a study program is to increase the skills of graduates and in

particular adaptation to the requirements of their future profession in the chemical industry. It also means more efficient use of potential of graduates for a real full-fledged expertise, which they studied and they can start to utilize earlier than if they had not received the upgraded program. It would enable graduates faster career advancement a valuable inclusion in a future employer.

7.1 Legal and administrative obstacles for innovating curricula

The decisive influence on the curriculum of study is subject to the Accreditation Commission. Problems when assessing applications may be due to administration errors in document processing, for example inappropriate structure, size or format of files submitted applications, or insufficient staffing necessary paperwork. Administrative burdens can be, given the necessary documentation, a significant innovation factor in upgrading curricula.

7.2 Technical and resources related obstacles for innovating curricula

The quality of education is ensured by developing of modern methods (such as e-learning), vocational training is continuously innovated by educational institutions who are including a professional internships into the curriculum and let participate practitioners in teaching. It is currently facing many difficulties such as the reduction of contributions to education, under-funding of universities and low wages of academic staff and insufficient spatial, material and technical conditions for teaching. The shortcomings in staffing study are also related to a non-existent system of education of academic staff, especially in the language field.

Technical colleges in the Czech Republic have sufficient laboratory and instrument facilities, there are internal grant schemes and incentive systems supporting R & D activities, there are present high IT skills and structure of information systems. Refurbished and newly built objects necessary for long-term development are owned by universities (disadvantage however, is the fragmentation of campuses). The quality evaluation system of science and research and other creative activities often prevails only formal evaluation and quantity without taking into account the actual level of output. Excessive bureaucratization, the

complexity of the evaluation system and the subjectivity of lowering the quality of scientific activities at universities. Basic research is hampered by increasing pressures on the direct applicability and the inclusion of this parameter in the funding of public universities.

7.3 Obstacles that affect negatively attractiveness of careers in chemical science and chemical engineering

If we want to educate competitive graduates, first we must have a competitive university teachers. The working conditions of academic staff are not too competitive. And not only in comparison with other countries, but also with the private non-academic spheres in the country.

Lack of funds causes that young academics often leave for a better job in the private sector or abroad. In the academic environment it also leads to a lack of generational replacement of academics and the gender imbalance. Especially in positions of Associate Professor/ Professor have fewer women only. Due to a demographic curve development a number of young academics will likely reduce in the next 5 to 10 years. There is already a high average age of professors and associate professors and missing middle generation of academics.

Due to the low motivation of academic staff for improving academic degrees the career growth is limited. Academics are less willing to take responsibility and work in senior positions. There is too little interest for professional growth within the international mobility by academics. Declining institutional and targeted subsidies from public funds with limited resources is lowering competitiveness of universities in attracting foreign experts and practitioners.

Another concern is that there is low interest of the young generation on chemical studies, technical fields in general. Currently, in the era of digital media and a wide range of leisure activities, it is significant that the young generation wants to achieve their personal goals within a minimum required effort. There is a growing demand for such education, which makes it possible, and it is often supported by non-systemic steps in the education system

(e.g. to facilitate the formation of new schools with very vague teaching load). Attractiveness of technical fields is declining mainly due to complexity and necessary knowledge for managing complex technical and scientific disciplines. Unfortunately, there was built an awareness that engineering graduates reach a satisfactory income compared with non-technical fields. The situation is even more serious that the near future will put even more demands on process automation, development and manufacture of specialty products, and the related research. Many graduates with non-technical education will not be usable in this process.

Increase the attractiveness of technical fields may be possible via increasing the employability of graduates in the labor market. This is linked with the necessary analysis of the current needs of industrial enterprises at regional levels and adjusting the focus and specialization courses to the required fields. Another possibility is increasing the attractiveness of the study and a higher degree of communication from major employers to graduates, organization and presentation of their needs applicants and advocacy of successful graduates of various disciplines e.g. public's discussion forums, trade fairs, conferences, seminars and social networks. To involve successful student organizations. However, hand in hand with this, it must be followed by a financial rewards of such employees.

Lack of candidates in technical fields it is a long term phenomenon, which is also supported by an unfavorable demographic developments. Getting the required amount of applicants for study and above all the best high school students can be achieved by a purposeful cooperation between universities founder (county) and secondary schools or offer interesting topics for a secondary schools' expert activities.

8 Other key issues to be addressed

9 Cefic questionnaire in Annex

Resources:

- SWOT analysis project OPVK "*Individuální projekt národní KREDO*", 2014.
- MŠMT, odbor analytický: Data o studentech, poprvé zapsaných a absolventech vysokých škol. Staženo z http://www.msmt.cz/vzdelavani/skolstvi-v-cr/statistika-skolstvi/data-o-studentech-poprve-zapsanych-a-absolventech-vysokych
- Výstupy setkání "*Kulatý stůl k problematice vzdělávání pracovníků pro konkurenceschopný chemický průmysl*", VŠCHT Praha, 15.1.2015.
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