

# სექცია 2. ეკონომიკის სექტორების ბანკოთმარების თანამედროვე პრობლემები

## EXPERT EVALUATION OF THE RELEVANCE OF ENABLING COMPETENCIES / INDIVIDUAL SKILLS IN THE ACTIVITIES PURSUED BY ENERGY AND ENVIRONMENTAL SECTORS

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**Abstract.** Scrutiny of scientific papers and other reference sources justify the relevancy of competencies acquired in the pursued activities. A new modern approach towards the enabling competencies/individual skills is associated with the capabilities comprising critical thinking and analysis, technology knowledge and research skills, as well as quantitative and critical legal thinking skills. For the purpose of identifying the relevance of enabling competencies/individual skills in the activities pursued by energy and environmental protection sectors, expert evaluation of the energy and environmental sectors was conducted. The indices of non-parametric Kendall's  $W$  test and  $H_0$  hypothesis test have indicated either good or very good compatibility of expert evaluations. The evaluated relevance of enabling competencies/individual skills via ranking method in the activities of energy and environmental sectors have indicated *critical thinking and analysis* to be the most relevant ones though *research skills and critical legal thinking* were ranked the second and *technology knowledge skills* were the third, and finally, *quantitative skills*, appeared to be the least relevant. The most relevant enabling competencies/individual skills highlighted by experts as the most relevant ones, concern, to a larger extent, the performance of a specific work, group of works or functional area works, which are of topical relevance in the area of energy and environmental sectors.

**Keywords:** *competencies, enabling competencies/individual skills, expert evaluations, ranking, energy and environmental sectors.*

### INTRODUCTION

**Relevance.** Analysis of scientific papers and other reference sources point to the competency being associated with successful accomplishment of a complex activity and described as an overall/single ability, which covers the whole of knowledge, skills, value propositions and personal qualities constantly changing in the process of the activities pursued. The study of the rel-

evance of competence in the activities evidences that the competencies are personal qualities that encourage activities of a higher level (Spencer and Spencer, 1993; Lustri, Miura & Takahashi, 2007; Boyatzis 2008, 2011; Martinkienė, 2014; Rekašienė & Sudnickas, 2017). These qualities include aptitudes (natural talent, susceptibility to improvement/self-improvement), abilities (the practical application of a talent) and knowledge (necessary information for task achievement) (Lustri, Miura & Takahashi, 2007, p. 186).

**Problem.** Numerous scientists of different areas who tackled the importance of the notion of *competencies* used to go deep to the abundance of competency aspects nevertheless, no common opinion has been reached in the description of its conception and structural components (Martinkienė, 2014; Raudeliūnienė, 2016). Due to multiplicity of evaluation methods and their versatility in terms of complexity, none of them has been acknowledged to be the universal one. Moreover, the opinion of evaluating experts is usually different and even contradictory, thus the present evaluation attempts at identification of relevant enabling competencies / individual skills and the way they are expressed in the activities of energy and environmental sectors.

**The goal:** Performance of expert evaluation of the relevance of enabling competencies/individual skills in the activities of energy and environmental sectors and identification of the most relevant competencies.

**The research methods and the stages of research organisation. The analysis of scholarly literature,** which serve as basis for the presented concept of competency in the context of activities (Spencer & Spencer, 1993; Lustri, Miura & Takahashi, 2007; Boyatzis, 2008, 2011; Martinkienė, 2014; Melnikas, Jakubavičius, Strazdas, Chlivickas, Lobanova & Stankevičienė, 2014; *Human Resources Professional Competency Framework*, 2014; *Competency Framework. OECD*, 2014; Bharwani & Talib, 2017; Tsimba, Mathuva & Mwenda, 2017; et

al.). The analysis of scholarly literature and *Human Resources Professional Competency Framework* (2014) enabled elaboration of a structured questionnaire which includes identified enabling competencies/individual skills.

From the point of view of V. Podvezko (2005), the assistance of professionals (experts) is indispensable for the purposes of solving economic and social problems, the comparison of different technology or innovation projects, forecasting the development of the process, evaluation of various operational strategies or the strategic potential of the object. The opinion of energy and environmental sector experts on the enabling competencies/individual skills in the activities pursued can be attributed to **expert evaluation**, which is understood as a generalized opinion of expert group derived upon application of expert knowledge, experience and intuition. This is a procedure enabling harmonization of the opinions of individual experts and formulation of a common solution. This is one of the most trusted data checking or justification methods that require specialized expertise and experience in a particular area that is not available with many professionals. An expert assessment method enables the improvement of quality and rationality of the decision-making process, since professionals (experts) can be included in all stages of the decision-making process (Sėrikovienė, 2013, p. 29). Experts may often have different, controversial opinions and attitudes to the problem, thus it is important to establish the concordance of expert opinions (Podvezko, 2005, p. 101; Podvezko & Podviezko, 2014, p. 112). The results of expert evaluations may be applied in practice if a sufficient level of concordance of expert opinions is determined (Podvezko, 2005, p. 101). Kendall's concordance coefficient  $W$ , calculated on the basis of *ranking* of the evaluated objects has been applied for the determination of compatibility level of expert evaluations. In this research the choice of experts was determined by the following: 1) the need to perform expert evaluation of the relevance of enabling competencies/individual skills in the activities of energy and environmental sectors and identification of the most relevant competencies; 2) peculiarities of sectors as the sectors of energy and environment are among the most important sectors of the economy both in economic and social and political terms, thus their peculiarities determined the choice of experts in energy and environment who are practitioners daily dealing with individual elements and processes of management and high knowledgeable of sector's activities "from the outside" and "from within".

**The stages of research organisation:** 1. sampling of experts; 2. elaboration of the standardized questionnaire to experts; 3. expert evaluation, encoding data by means of the SPSS statistical program; 4. identification of concordance of expert opinions by means of Kendall

concordance coefficient  $W$  and the test of  $H_0$  hypothesis, as well as data analysis and summary.

**10 experts were selected for expert evaluation according to the following selection criteria:** 1) position held; 2) higher university education; 3) expert work experience in the energy or environmental sectors (at least 3 years).

**The expert survey was conducted in April 2018.**

The level of compatibility of experts evaluation was established choosing the Kendalls' coefficient of concordance  $W$ , which is calculated ranking the assessed criteria (Kendall, 1962). The closer the value of the concordance coefficient  $W$  is to the one, the higher is the level compatibility of evaluations. If evaluations differ relevantly, the value  $W$  approximates the zero (Čekanašius & Murauskas, 2002, pp. 40–42, 2008, p. 40; Podvezko, 2005, pp. 101–102; 2006, pp. 82–83; Podvezko & Podviezko, 2014, p. 112). The identification of the level of concordance of expert's evaluation of the criteria with the value  $m_{x^2} = 7$  was carried out using the value of the distribution (chi-square).

**Statistical hypotheses are formulated** (Čekanašius & Murauskas, 2008, p. 41):  $H_0$ : **expert evaluations are controversial** (i.e. concordance coefficient equals 0);  $H_1$ : **expert evaluations are similar** (i.e. concordance coefficient does not equal 0).

**The results of the conducted nonparametric statistical test show** the mean rank of all the evaluated criteria, the sample size ( $N=10$ ), the value of Kendalls' coefficient of concordance ( $W$ ), the value of Chi-square, the number of degrees of freedom ( $df$ ) and the p-value (*Asymp. Sig.*).

**Research ethics.** The research was conducted without violating the rights of research subjects and observing the ethical principles. The experts were introduced to the purpose of the research and the results of the research.

**The analysis of the data of the experts questionnaire survey was conducted with the help of the specialised statistical programme IBM SPSS Statistics for Windows 22.0 and the programme Microsoft Excel 2010.**

**A group of 10 experts was selected on the basis of non-probability targeted sampling:** five experts worked in the energy sector, the other five in the environmental sector. All experts had higher university education (8 acquired Master's degree, 2 were Doctors of Science) and at least 3 years of work experience: 1 expert worked as director, 4 experts worked as project managers, 1 was the head of the energy efficiency group, 1 was senior researcher, 2 were product managers, 1 was project development expert. All experts indicated that they had at least 3 years of professional experience, including 5 with 6–10 years, 3 with 16–20 years and 2 with 3–5 years. The work of 3 experts involved in the survey relates to energy management, 2 experts are

related to environmental management and administration, and the other 2 are related to the preparation of investment plans. The main activities of the remaining 3 experts are related to energy production, transmission, distribution, supply (1 person); waste management and management (1 person); air pollution, noise calculation, simulation (1 person).

## RESEARCH RESULTS

*Human Resources Professional Competency Framework*, 2014, p. 26 was relied on for the sake of performing expert evaluation of the relevance of enabling competencies/individual skills in the activities of energy and environmental sectors and identification of the most relevant competencies. **Enabling competencies/individual skills** include *critical thinking and analysis, technology knowledge, research, quantitative and critical legal thinking skills*, which constitute individual components. In the course of expert evaluation these components were ranked with subsequent identification of the most relevant and the least relevant ones.

Expert evaluation outcome revealed that the most relevant component of **critical thinking and analysis** was *the ability to perceive and analyse problems, and to foresee the challenges* though less relevant component covered *the ability to think flexible and innovative, and the ability to notice interrelation of different aspects of the problem* was found to be the least relevant.

As for **the ability of technology knowledge**, the most relevant component was *the ability to foresee new potential brought by the new technologies* while *the ability to use most efficient technologies* was found less relevant and *the ability to implement and manage new technologies* was given the least relevance.

The most relevant component of **the research abilities** was *the ability to integrate other people into the practices of organization*, and *the ability to efficiently collect the data* was reported as less relevant while the least relevance was given to *the ability to efficiently collect the data by making decisions in the area of human resources*.

It has been identified, that the most relevant component of **quantitative abilities** was *the ability to analyse, forecast and interpret*, while *the ability to evaluate (measure)* was less significant while the least relevance

was given to *the ability to work with quantitative data*.

The most relevant component of **critical legal thinking abilities** was *the ability to logically evaluate the situations based on legal analysis* while *the ability to immediately perceive the most critical legal problems* was identified as less relevant, and *the ability to perceive and assess the benefit of alternative legal interpretations and the ability to analyse situations from legal perspective* was reported to be of the least relevance.

The analysis identified the abilities of **the enabling competencies/individual skills** (to which the abilities of critical thinking and analysis, technology knowledge, research, quantitative and critical legal thinking abilities are attributed) of the most relevance for energy and environmental sector activities.

As it is illustrated in Fig. 1, the most relevant enabling competencies/individual skills are *critical thinking and analysis*. *Research skills* are the second by relevance and *critical legal thinking capabilities* are the third by relevance. *Technology knowledge* are the fourth by relevance. *Quantitative skills* are the least relevant.

The indices of non-parametric Kendall's  $W$  test demonstrate mean ranks, parameter value ( $N=10$ ), Kendall's concordance coefficient  $W$  (0.810) value, Chi-square criterion value ( $Chi-Square = 32.400$ ), free degree number ( $df = 4$ ) and  $p$ -value ( $Asymp. Sig. = 0.000$ ) of all evaluated components. Kendall's concordance coefficient  $W = 0.810$  show good concordance of the opinions of experts having participated in the research and the perform  $H_0$  hypothesis test conforms that this concordance coefficient  $W$  does not equal 0, and  $p$  values are lower that the chosen level of significance ( $\alpha = 0.05$ ).

The most relevant enabling competencies/individual skills in the energy and environmental sectors are *critical thinking and analysis* related to solving day-to-day problems; understanding of key issues; presentation of problems and opportunities; formulating effective solutions and strategies; situations considered in order to make rational decisions and rulings; addressing complex human resource challenges. The least relevant are *quantitative skills* related to the analysis of simple data/information; accumulation and analysis of important data groups; carrying out complex studies and their inclusion in the wider application.

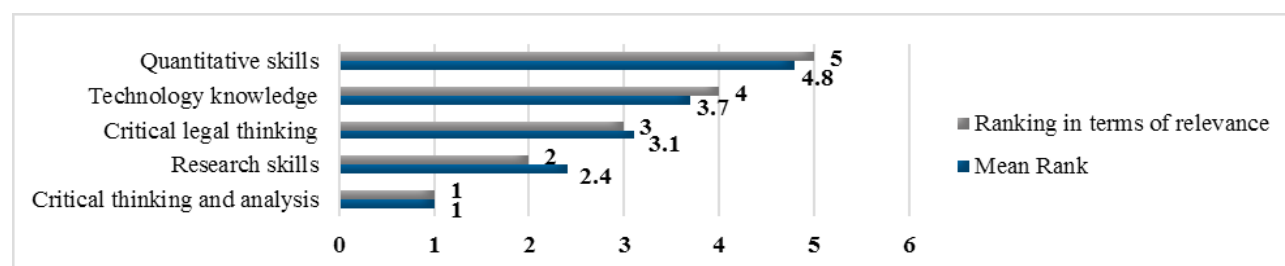


Fig. 1. Evaluation of relevance of enabling competencies/individual skills

## CONCLUSIONS

Upon performance of the analysis of scientific papers and other reference sources the competencies of critical thinking and analysis, technology knowledge, research, quantitative and critical legal thinking abilities, all these constituting different components, have been attributed to the enabling competencies/individual abilities.

Expert evaluation of the relevance of enabling competencies/individual abilities in the activities of energy and environmental sectors has been performed and the most relevant competencies have been identified via application of ranking method.

The results of the conducted nonparametric statistical test and the calculated values of the Kendall's concordance coefficient (0.810) show that the opinions compatibility of 10 experts' evaluations is good.

The evaluation of relevance of *enabling competencies/individual skills* in activities ranks *critical thinking and analysis* as the most relevant. *Research capabilities* are the second by relevance, *quantitative skills* are the least relevant.

It has been identified by expert evaluation, that the enabling competencies /individual abilities concerning the performance of a specific work, certain group of works or functional area works are of topical relevance in the area of energy and environmental sectors.

The research results justify theoretical assumptions, that no universal method is available so far to evaluate the relevance of competencies, nevertheless, expert evaluation methods is considered to be one of the most reliable evaluation methods, which can be employed for evaluation of competencies of any activity pursued.

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