

“Be Competent in Entrepreneurship”:

**Knowledge Alliances for Developing Entrepreneurship
Competencies for the Benefit of Higher Education and Business**



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1. Introduction

For understanding a needful entrepreneurship competence (EC) according to employers' needs and societal demand the survey was conducted at the beginning of the project during intervention sessions among students, and employees mostly in partner companies. Current short report about the results of the survey represents the first stage of the research to determine the initial situation about the level of entrepreneurship competence based on the self-assessment of EC. In this survey entrepreneurship competence is defined as a comprehensive framework of sub-competencies for personal and professional development of learners.

The aim of the report is to conduct the survey using students entrepreneurship competence questionnaire (SECQ) among students and employees. For this purpose objectives are to:

- develop the research methodology for conducting survey among students and employees
- elaborate and adjust the EC self-assessment tool for target groups
- analyse the survey results about the level of EC of students and employees
- analyse the differences of the level of EC of students and employees and determine the need for the development of EC in both target groups

When assessing the results of the survey analysis the experiences of previous research were considered, e.g. the previous research results in the sense of personal competencies such as problem solving, growth mindset, coping with emotions (e.g. Moore & Morton, 2017; Dweck, 2016; Ryan & Deci, 2000), which needs development at the universities.

Also the expected results among employees were compared with the earlier findings, for example in understanding how to discover the opportunities to act upon (e.g. Hynes & Richardson, 2007; Mitchelmore & Rowley, 2013) or about the creation of supportive learning environment for employees to move towards new ideas and innovativeness (e.g. Ellström, 2010).

The results of self-assessment of entrepreneurship competence among students and employees were analysed and compared by countries and by generations to understand the skills gap between competencies gained from university and real life needs. Based on the comparison of assessments between students and employees, the sub-competencies with lower level assessments are identified for students and employees. The results of analysis are used for the first step to support the development of entrepreneurship competence in entrepreneurship education courses of partner universities.

This report is based on D1.2.

The authors are: Urve Venesaar, Marianne Kallaste, Katrin Arvola supported by partner companies: EVEA, BIT, Kaubamaja and other partner universities and companies.

2. Research methodology for conducting survey among students and employees

The starting point for the research strategy is mapping of the current situation in HEI and at the workplaces of enterprises, and identifying the skills' gap in ECs for the development of education in HEIs. The compilation of self-assessment tools, development of study programmes and innovative teaching strategies are relying on the Estonian entrepreneurship competence model (Venesaar et al, 2018), relying on the experience of Estonian entrepreneurship education programme (2016-2018) and adopted for the project. Based on the definition of entrepreneurship, the concept of entrepreneurship competence can be conceived as a comprehensive set of knowledge, skills and attitudes that are essential for value creation during the implementation of ideas, for the development of entrepreneurial mind-set of learners, and sustainable coping with work and everyday life.

The self-assessment tool includes the questions and statements determining the level of needful competencies of target groups and for employees and SME managers' questions about the workplace as a learning environment. The questions of each sub-competence of self-assessment tool consists of 2-5 statements. Cronbach's Alpha in total for all items was 0.91 for student respondents and 0.94 for employee respondents, which is of acceptable reliability coefficient.

The study was carried out during 2020 among students (n=1137) of partner universities and employees in partner countries (n=754). Besides partner enterprises the survey was distributed also to some other enterprises (mostly SMEs). In the sample of students the generation z prevailed (80%) and among employees generation y (51%) prevailed following with generation x (32%).

The use of a self-assessment tool (Students Entrepreneurship Competence Questionnaire-SECQ) for students and employees makes it possible to identify the skills gap between university learning outcomes and practical needs. The SECQ includes questions for assessing fourteen sub-competencies of the entrepreneurship competence model in four areas (self-management; value creative thinking; managing social situations; acting upon opportunities and ideas) using 5-point self-rating response scale (1 = totally disagree; 5 = totally agree). SECQ includes questions for assessing fourteen sub-competencies, number of items, the source of statements adopted to project needs (sample statements in parenthesis):

- *Metacognition* was measured with 3 items adapted from Pintrich (1991) (e.g. 'I analyse what I already know about this situation');
- *Growth (fixed) mindset* was measured with 3 items adapted from Yeager and Dweck (2012) (e.g. 'Entrepreneurship is something you cannot change much with learning and education');
- *Autonomous motivation* was assessed with 4 items (Weinstein, Przybylski and Ryan, 2012) (e.g. 'My actions are congruent with who I really am');
- *Emotion regulation* was assessed with 3 items adapted from Garnefski and Kraaij (2006) (e.g. 'I can manage my feelings if something goes wrong');
- *Creativity* was measured with 3 items, (Karwowski, 2014) (e.g. 'I believe in my creative abilities');
- *Problem solving* was assessed with 4 items (Basadur, 1995; Basadur & Goldsby, 2016) (e.g. 'I ask myself lots of different questions about the nature of the problem');

- *Planning* was measured with 4 items inspired in Dawson and Guare (2011) and Cowan (2014) (e.g. 'I typically break big tasks down into subtasks and timelines');
- *Ethical and sustainable thinking* was measured with 4 items (Ploum, Blok, Lans and Omta, 2017) (e.g. 'I can identify well the opportunities of sustainable development');
- *Personal initiative* was measured with 3 items, (Frese, 2009 and Frese & Fay, 2001) (e.g. 'I have been usually a powerful force for constructive change')
- *Communication skills* was assessed with 3 items, (Zhou and Ee, 2012) (e.g. 'I am tolerant of my partners' mistakes');
- *Cooperation skills* was also measured with 3 items, (Lower, Newman and Anderson-Butcher, 2015) (e.g. 'I am able to cooperate with different kinds of people');
- *Opportunity discovery and exploitation* was measured with 4 items adapted from Tang, Kacmar and Busenitz (2012) and Kyndt and Baert (2015) (e.g. 'I can recognise the untapped opportunities');
- *Understanding environment* was measured with 3 items (Man *et al.*, 2008) (e.g. 'I am aware of the development trends in my specialty/area of activity'); and
- *Financial literacy* was measured with 4 items, (Kyndt and Baert, 2015; OECD, 2016) (e.g. 'Before I invest money, I examine other possibilities').

The entrepreneurship competence self-assessment among students and employees are analysed using descriptive statistics, including calculating mean values. The one sample T-test was used to analyse the significance of the difference between the entrepreneurship competence assessments between students and employees. Samples were divided according to their previous experience in entrepreneurship to find more detailed results and analysis were compared with data from previous studies (e.g. GEM). Data was analysed using the SPSS 26.

3. Analysis of a needed EC for students and employees according to employers needs and societal demand

The mean of self-assessment of entrepreneurship sub-competencies among students and employees is fluctuating between 3.36 and 4.40 in the 5-point scale. In most sub-competencies the difference between the assessments of students and employees of the total sample is statistically significant except for sub-competencies of emotion regulation, problem solving, planning and communication.

Table 1. Means and difference between the self-assessment of entrepreneurship sub-competences of students and employees (all countries)

Entrepreneurship competencies	Student		Employee		Δ	t	P
	M	SD	M	SD			
Metacognition	4.12	.62	4.03	.77	-0.09	2.858	.004*
Growth mindset	3.56	.83	3.68	.85	0.12	-3.042	.002*
Autonomous motivation	3.92	.71	3.84	.73	-0.08	2.351	.019*
Emotion regulation	3.67	.77	3.70	.75	0.03	-.862	.389
Creativity	3.80	.74	3.91	.81	0.11	-3.019	.003*
Problem solving	3.91	.63	3.92	.69	0.01	-.339	.734
Planning	3.75	.71	3.72	.75	-0.03	.869	.385
Ethical and sustainable thinking	3.88	.63	3.78	.72	-0.10	3.266	.001*
Communication	3.91	.69	3.94	.74	0.03	-.976	.329
Personal initiative	3.36	.88	3.52	.89	0.16	-3.928	.000*
Cooperation	4.40	.64	4.28	.74	-0.12	3.838	.000*
Opportunity discovery	3.60	.71	3.41	.82	-0.19	5.260	.000*
Understanding the environment	3.90	.63	3.53	.88	-0.37	10.58	.000*
Financial literacy	4.12	.68	3.99	.79	-0.13	3.817	.000*

Note: *p<0.05. Independent sample T-test

Next, the overview about the perceptions of entrepreneurship competence by sub-competencies through self-assessment of students and employees (incl SME managers) are presented by countries. The perceptions of employees about their competencies are considered as employers need for competencies at the workplaces. The lower assessments by students means that students have a shortage in these competences and for increasing their employability the development of these competencies should be supported in universities. It should be mentioned also that not all differences between the assessments of students and employees by countries and generations are statistically significant. Therefore these results need to be checked in further research.

The sub-competencies with lower scores in 5-point scale are estimated based on:

- 1) the average level of self-assessment of entrepreneurship competence sub-competencies among students and employees (see Table 2);
- 2) the comparison between self-assessment of entrepreneurship competence sub-competencies between students and employees by countries (see Figures 1-5 and Table 3)

3) the average level of self-assessment of entrepreneurship competence sub-competencies of students and employees by generations (Figures 6-8 and Table 4);

3.1. The average level of self-assessment of EC among students and employees;

For the estimation of sub-competencies with lower scores based the average level of self-assessment among students and employees (separately) the selection was carried out as follows: 1) five sub competencies were selected in each country among the areas characterising students' personal development (i.e. self-management, creative thinking and managing social situations) and 2) sub-competencies with the lowest score was marked in the area of characterising students ability of acting upon opportunities. The summary selection includes six sub-competencies characterising students' personal development marked in more than one country: **growth mindset, emotion regulation, creativity, planning, ethical and sustainable thinking, personal initiative** (Table 2). In the area of acting upon opportunities students have assessed lowest the sub-competence of **opportunity discovery and exploitation** in all countries. Although the mean values of the self-assessment of sub-competencies of employees were different compared with students, the ranking of self-assessment of sub-competencies of employees with lower scores by countries is mostly aligning with the self-assessment of students. In addition, employees in two countries have assessed with low score also the sub-competence of autonomous motivation.

Table 2. The summary of self-assessment of entrepreneurship sub-competencies with lower scores in 5-point scale among students by countries

	Estonia	Finland	Poland	Portugal	Italy
Metacognition					
Growth Mindset	x	x	x	x	x
Autonomous Motivation	x				
Emotion Regulation	x		x	x	x
Creativity		x		x	x
Problem Solving					
Planning	x	x	x	x	
Ethical and sustainable thinking		x	x		
Communication					x
Personal Initiative	x	x	x	x	x
Cooperation					
Opportunity Discovery	x	x	x	x	x

Understanding Environment					
Financial Literacy					

3.2. The comparison between self-assessment of sub-competencies between students and employees by countries

The comparison between the self-assessment of sub-competencies between students and employees by countries is presented in Figures 1-5.

In Estonia students have assessed lower than employees four sub-competencies: growth mindset, creativity, communication and personal initiative (Figure 1).

Employees have assessed lowest the sub-competence opportunity discovery followed by understanding environment, emotion regulation and growth mindset.

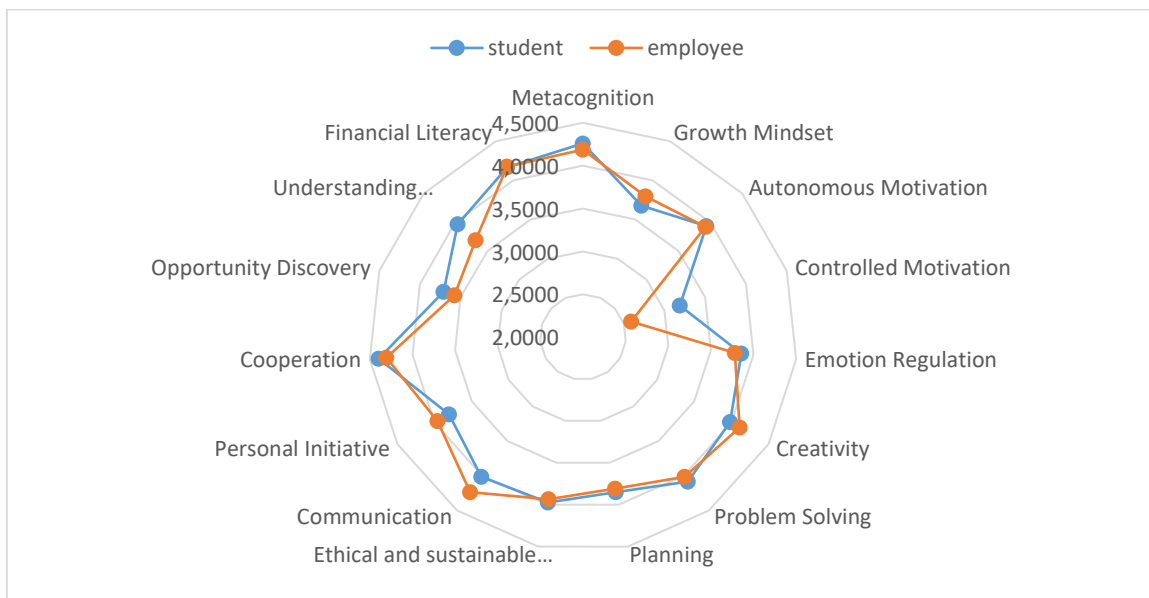


Figure 1. Self-assessment of entrepreneurship competence by students compared with employees in Estonia

In Finland students compared to employees have assessed lower growth mindset, creativity, problem solving, ethical and sustainable thinking and personal initiative (Figure 2).

Employees have assessed lowest personal initiative followed by opportunity discovery and planning skills.

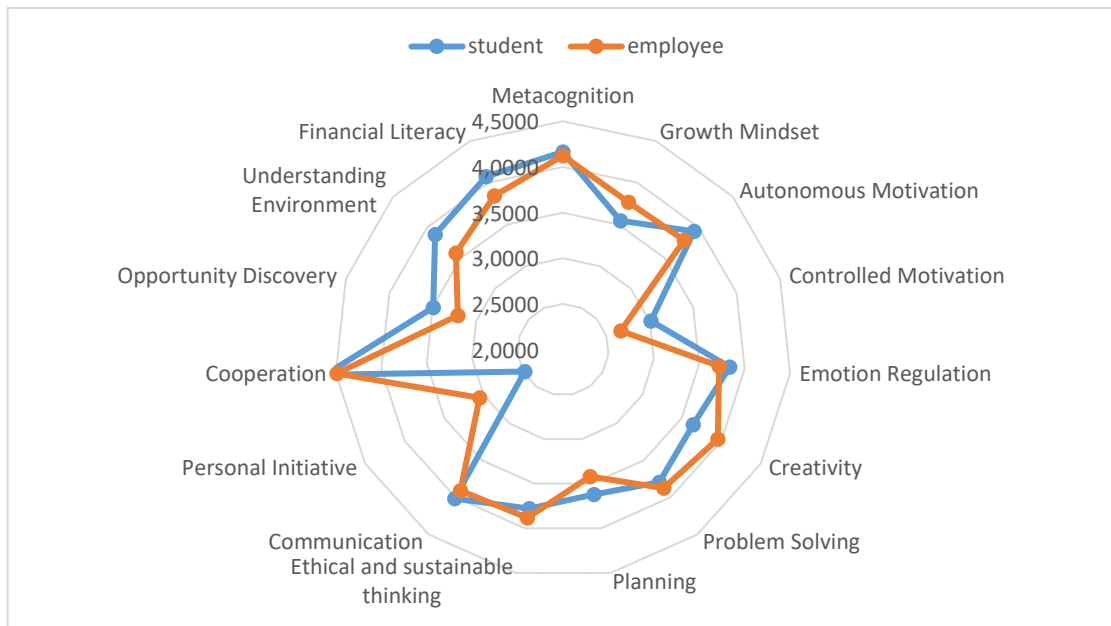


Figure 2. Self-assessment of entrepreneurship competence by students compared with employees in Finland

In Poland students have assessed all sub-competencies higher than employees (Figure 3).

Employees have assessed lowest personal initiative followed by opportunity discovery, ethical and sustainable thinking and emotion regulation.

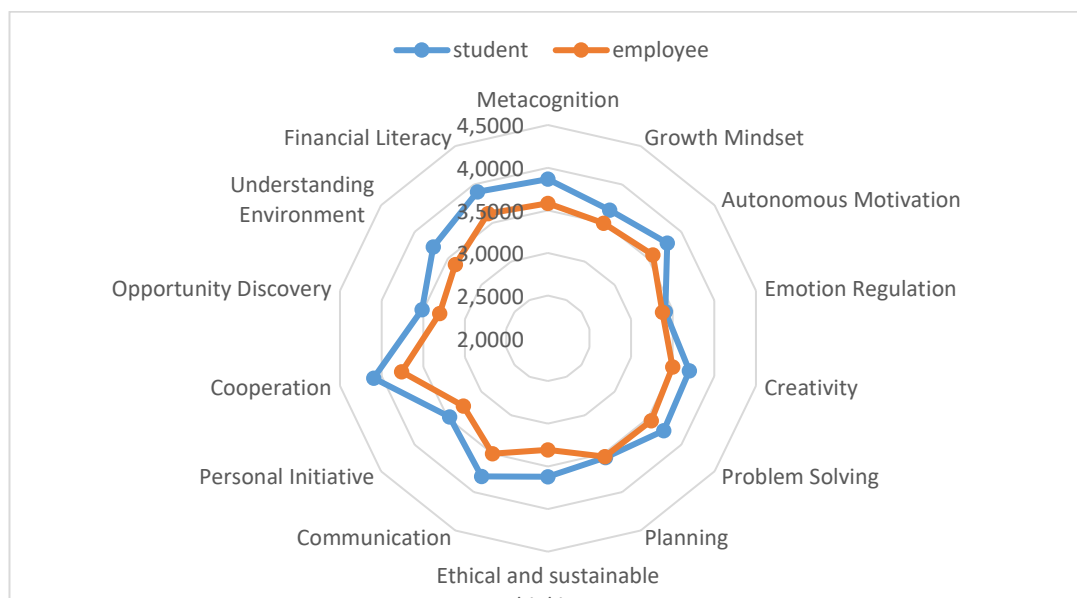


Figure 3. Students compared with employees, Poland

In Portugal students have assessed lower than employees metacognition, growth mindset, emotion regulation, creativity, problem solving, communication, personal initiative, cooperation and opportunity discovery (Figure 4).

Employees have assessed lowest opportunity discovery followed by planning skills, emotion regulation and autonomous motivation.

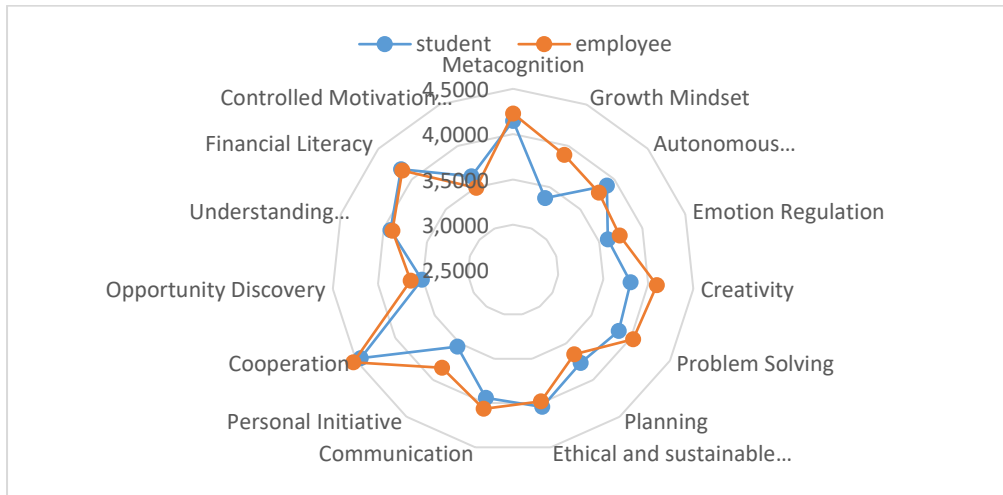


Figure 4. Students compared with employees, Portugal

In Italy students have assessed lower than employees the following sub-competencies: emotion regulation, communication and cooperation (Figure 5).

Employees have assessed the lowest understanding environment followed by opportunity discovery, personal initiative and growth mindset.

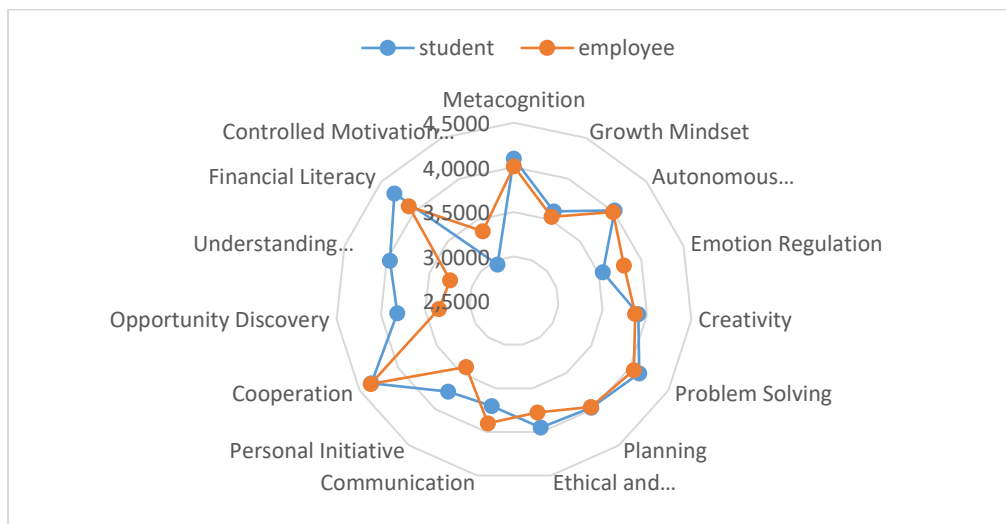


Figure 5. Students compared with employees, Italy

According to the comparative analysis of entrepreneurship competence self-assessment of students and employees, six sub-competencies were assessed lower among students compared with employees in more than one country including **growth**

mindset, emotion regulation, creativity, problem solving, communication and personal initiative (Table 3). These sub-competencies are chosen to start project activities on the development of entrepreneurship education programmes and piloting on how to embed new guidelines into course programmes in partner universities.

Table 3. The summary of sub-competencies assessed lower by students compared with employees.

	EST	FIN	PL	PT	IT
Metacognition				x	
Growth mindset	x	x		x	
Autonomous motivation					
Emotion regulation				x	x
Creativity	x	x		x	
Problem solving		x		x	
Planning					
Ethical and sustainable thinking		x			
Communication	x			x	x
Personal initiative	x	x		x	
Cooperation				x	x

Note: x – sub-competence assessed lower by students compared with employees;

3.3. The average level of entrepreneurship competence self-assessment of students and employees by generations

Based on the sample size of students of z-generation (~80%) and y-generation (20%), who are entering to the labour market, the summary of countries shows the expectations of labour market towards students, i.e. which sub-competencies of personal development students have assessed lower compared with employees of y-generation (Table 4).

The specified analysis of survey results by countries and generations have helped to bring on different characteristics of both samples, students and employees, but it is possible to find some similar patterns between countries. For example, students of z-generation of Estonia and Poland have assessed most of the sub-competencies lower than students of y-generation; in Finland, Portugal and Italy, only few (1-3) sub-competencies have assessed lower among students of z-generation. When looking at the characteristics of employees, in Poland, Portugal and Italy employees of y-generation have assessed most of sub-competencies lower than employees of x-generation, but in Estonia and Finland, most of employees of y-generation have assessed higher (with few exceptions) the sub-competencies compared with employees of x-generation.

Table 4. Entrepreneurship competence self-assessment of students of z- and y-generation lower than employees of y-generation.

	Estonia	Finland	Poland	Portugal	Italy
Metacognition	a			ab	
Growth Mindset	ab	a		a	b
Autonomous Motivation	a				
Emotion Regulation	a			ab	ab
Creativity	ab	a		a	
Problem Solving				ab	
Planning					b
Ethical and sustainable thinking	ab			b	
Communication	ab			ab	ab
Personal Initiative	b	a		ab	
Cooperation	a			ab	b

Note: a) lower self-assessment of students of z-generation compared with employees of y-generation; b) lower self-assessment of students of y-generation compared with employees of y-generation.

Sub-competencies students have assessed lower than employees are chosen first for piloting the development of teaching and learning models in partner universities. As a result the piloting experience of teaching staff and the feedback from students in partner universities will be a basis for further improvement of teaching guidelines on how to embed the sub-competencies supporting the enterprising attitudes and behaviour of learners. Sub-competencies which are assessed lowest by employees can be a target for the development through the creation of expansive learning environment at the workplaces in companies.

The analysis shows country-specific differences in sub-competencies needed for special attention for the successful transition from the university to the working life. Based on current study in the example of three countries (Estonia, Finland, Portugal) there is a need to support personal initiative during university studies to prepare students for future entrepreneurial tasks. The results from Finland and Portugal indicate that the needful specific competencies are growth mindset and creativity. The results from Italy and Estonia indicate the importance of communication development as an important factor for entrepreneurship. These results have important implications for some countries. For example, in Italy it seems to be important to develop specific competencies like autonomous motivation, and in Portugal, it appears that students need to improve their problem solving abilities.

Competencies with a higher level of assessment by students compared with employees refer to a shortage of these competencies among employees. In the first case, the research results are referring to the need for more support to develop these competencies in universities to address labour market demand better. In the second case the development of entrepreneurship competencies can be arranged on-the-job (e.g. through the development learning environment at the workplaces). In both cases,

the specificity of each country and the skills required for the job should be considered to formulate the final recommendations for practice.

In addition to a need of special support of sub-competencies showed in study results above it is important for the educational institutions that for the development of entrepreneurship competence it is needful to consider the principle of systems thinking, It means that all sub-competencies are interrelated with each other and more general (i.e. personal) competencies are important for supporting the specific (i.e. professional) area of competence of acting upon opportunities and ideas of different professions. Therefore all sub-competencies are important to acquire overall entrepreneurship competence. The development of entrepreneurship competence can be consciously supported and embedded in the learning process of different subjects (European Commission, 2012, 2014).

3.4. The analysis of interrelation between acting upon opportunities and competencies needful to be enterprising person of students and employees

Next analysis is carried out derived from the need for the development of all sub-competencies to support students for being an enterprising person. For that the dependent variable chosen is acting upon opportunities as a core area of the entrepreneurship competence. A simple multiple linear regression was calculated to predict acting upon opportunity based on self-management sub-competencies, creative thinking and problem solving sub-competencies and social skills sub-competencies. In general all statements of sub-competencies are taken for analysis, but in growth mindset and communication skills the statements with higher assessment were selected for analysis. As the result of analysis all independent variables were significant predictors of acting upon opportunity Table 5).

Table 5. Regression results about the relationship between acting upon opportunity and entrepreneurship sub-competencies supporting the development of students' self.

Dependent	Acting Upon Opportunity			
Independent	Metacognition	Growth Mindset	Autonomous motivation	Emotion Regulation
Students	0,182** (0,025)	0,038** (0,015)	0,159** (0,022)	0,141** (0,020)
F Statistics	78,77			
R2	0,222			
Adjusted R2	0,219			
Independent	Problem Solving		Planning	Sustainability
Students	0,159** (0,018)	0,217** (0,024)	0,117** (0,020)	0,231** (0,022)
F Statistics	229,829			
R2	0,455			

Adjusted R2	0,453		
		Personal	
Independent	Communication	Initiative	Cooperation
Students	0,067** (0,021)	0,216** (0,016)	0,271** (0,023)
F Statistics	155,902		
R2	0,292		
Adjusted R2	0,290		

The regression analysis was conducted also among employees and as a result all sub-competencies are crucial part of entrepreneurship competence being a significant predictors for acting upon opportunity and entrepreneurship competence should be therefore considered as one entity. It means that to support the entrepreneurship competence development during education it is crucial to handle all sub-competencies, not just select random sub-competencies.

Conclusion and implications

This deliverable presents a needs analysis for supporting the development of EC among students in comparison with employees. The results of analysis have highlighted six competencies which were assessed lower among students compared with employees in more than one country such as growth mindset, emotion regulation, creativity, problem solving, communication and personal initiative. These results give the overview about competencies necessary to develop in higher education. Current research results are supporting the previous research results in the sense of personal competencies such as problem solving, growth mindset, coping with emotions (e.g. Moore & Morton, 2017; Dweck, 2016; Ryan & Deci, 2000), which needs development at the universities. But the research is providing also a methodology for self-assessment of students' competencies (incl the analysis by generations) and the way, how to identify the need for the development of these competencies during university studies (see more in D3.3.). This methodology can be also used in other European countries.

Among employees the opportunity discovery competence is assessed lower compared with students. It needs attention at the workplace since for enhancing entrepreneurial performance it is important to understand how to discover the opportunities to act upon (e.g. Hynes & Richardson, 2007; Mitchelmore & Rowley, 2013). These competencies are needful for the continuous personal and professional development and employability in a society and needs to be backed up with a supportive learning environment for employees to move towards new ideas and innovativeness (e.g. Ellström, 2010).

The information received from the research about the perception of entrepreneurship sub-competencies among students supports the development of course programmes and curricula in universities. For employers, the study provides an opportunity to analyse the employees' entrepreneurship competence. When an employee understands that the company supports their competence development, it is beneficial to the company's performance as well.

Although in this research the number of universities and countries is limited, the countries were selected from different European regions (North-South, developed and CEE countries). The methodology of research and the ways for supporting the development of entrepreneurship competence of students and employees can be used wider and the results of current research can be transferable to other regions and countries, but considering the specifics of the regions.

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