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Competencies in the supply chain education

-Student and labour market perspectives-

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Ph.D. dissertation

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Budapest, 2023

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ACKNOWLEDGEMENTS

I would like to take a moment to acknowledge the people who have enabled me to complete this Ph.D. over the past years.

First and foremost, I would like to express my gratitude for my supervisor professor Krisztina Demeter, who has been instrumental in developing my research project and my professional development. I am genuinely thankful for her continuous support in my work. My unofficial co-supervisor, Dávid Losonci (Ph.D.) who also deserves my gratitude for all the constructive discussions and collaboration throughout the research project.

Special thanks to my colleagues, Zsófi, Judit, and Orsi, for their support throughout the years and even more for all the fun we had in and outside the office.

To my colleagues, Judit Gáspár Ph.D., Andrea Gelei Ph.D. for their continuous support, encouragement, trust, engagement in my work.

Lastly, the greatest thank you to my family. The amount of support they have offered, especially in times when we all needed it. To my husband, thank you for supporting me in tough times, and enduring my nonsense.

Thank you!

1. Introduction

Due to the developments (IoT, AI, digitisation) and events (pandemic) experienced lately, current jobs are likely to change drastically in the coming years, some of the knowledge and skills required to fill them may become unnecessary, while the demand for new skills may increase. This constantly changing world imposes increasingly serious criteria on the lecturers and the potential employees (students) in order to become a successful and productive workforce in the labour market.

I hope that my research – with which I want to support the communication between the three stakeholders, and the result of which will be visible in the professional education of the students majoring in supply chain management university training and in their learnt competencies that meet the expectations – can help to achieve this goal.

This would make several of my big wishes come true. On the one hand, I can be present in the investigated field as a lecturer, and on the other hand, I can take part in honing, deepening, and emphasising the importance of the relationship between science and practise.

1.1.   Rationale for the choice of topic

The idea of my research area and with that the PhD training application came to me, when at my workplace, OKJ students attending logistics and freight forwarding training shared their rather negative experiences regarding their place of apprenticeship and to the competencies expected of them.

This prompted me to help them with a properly developed research that will hopefully move their situation in a positive direction, and the results of which will encourage those involved to take action. The research focused on examining and putting emphasis on the relationship of science/education and practice, updating the competency requirements experienced in the labour market, and searching for methodological solutions to the discrepancies.

The experiences of the first steps necessary to reach these goals can be read in the article (Paper1.) that I wrote with my supervisor Krisztina Demeter, for which, and all further help, I am very grateful to her. When starting my PhD studies, we conducted research on the opinion of master's degree (MSc) students attending supply chain management (SCM) training at Corvinus University of Budapest (CUB) about competency

expectations, their familiarity with the methods experienced in training, and the effectiveness of these methods in developing competencies. My further researches focus on analysing – with the use of factor analysis – the applied educational methods for developing the competencies of MSc students attending SCM training at Corvinus University of Budapest (Paper2.), on the competencies expected of them in the labour market and the competencies they believe are expected based on the newest international literature (Paper3.), and on the expectations and experiences of their (potential) Hungarian employers (Paper4.).

Since more and more research emphasises the importance of the relationship between science and practice, in the four presented articles I also wanted to support this with my results, as a possible way of solving the surplus-deficit between demand and supply.

In the following, I discuss the relevance of the topic choice, the structure of the dissertation, the research plan and its realisation, and the presentation of the results. Finally, recommendations based on synthesised results are concluded by the display of the publications.

1.2. The economic-social relevance of the choice of topic

The constant change of the expectations of competency experienced in the fields of supply chain management (SCM), the lack of human resources, the possible correlation between them, as well as the participation of workers in the field of transportation and logistics (Frey&Osborne, 2017) being at risk as a consequence of the spread of digitisation, all support the relevance of our research. This phenomenon requires the attention of all stakeholders (students, employers, and universities). The changes taking place in the economy and within the logistics sector result in changes in the characteristics of students entering higher education, which also establish the change in expectations for education (changes in methodology are necessary). Among other things, this also makes it necessary to get to know the ideas of employers and students regarding the expected competencies, and according to the argument of Dubay et al. (2019), 'empirical research on the lack of skills in the supply change is scarce' (p.144), which also indicates the need for this kind of research. The competencies needed for an effective and successful presence on the labour market have so far only been examined from the perspective of the employer, and the two education levels (OKJ-MSc) have not been distinguished from each other. In addition to the professional knowledge needed to reach and sustain the competitiveness of a company, the so-called soft skills and the importance of their development are

gaining more and more emphasis, which brings to the fore the cooperation of companies and higher education institutions.

The aim is to experience more prepared employees, less vacant jobs, less unemployed people, increasing competitiveness, minor migration, increasing satisfaction, and the narrowing of the gap existing between demand and supply in the economics.

Since there is no national research on these employer and student needs, my research is considered complementary research in the examined fields of the supply chain.

My goal is to map the differences between the competencies developed in education and those expected by employers in the SCM training, and to find possible ways to terminate the 'Gap'. I used the results of international research on the subject as a starting point for my research, the lack of which requires the update of the data.

Thesis structure

The thesis can be divided into three parts.

In the first part, you can read the rationale for the choice of topic, the economic-social relevance of the choice of topic, the statement of the problem, and the goal I want to reach with the research.

The second part contains the description and illustration of the research plan, the model, the applied concepts, and the content elements, after which I will talk about the examination of the research questions affecting the three sides (students-lecturers-practice), the introduction of the applied methodology, which concludes with the results, recommendations, and finally, further research possibilities.

The third part includes the papers about the researches.

Figure 1. Thesis structure

Introduction, Rationale for the choice of topic	
The relevance of the research, Statement of the problem	
Reseach framework: Rplan, Rmodell, clarification of concepts, R.method: research questions, hypotheses, conceptualization, operationalization	
Conclusion, recommendations	
Further research	
Paper1. Competencies of logistics and their potential for development	Budapest Management Review L. évfolyam 2019. 7-8. szám (Munkácsi Adrienn - Demeter Krisztina)
Paper2 Analysis of educational methods developing expected competencies in the logistics field by factor analysis.	Logisztikai trendek és legjobb gyakorlatok folyóirat, VI. évfolyam 2020. 1.számában (Munkácsi Adrienn)
Paper3. Competencies required for the implementation of an efficient supply chain from the perspectives of students and the labour market	Budapest Management Review LII. évfolyam 2021. 5. szám (Munkácsi Adrienn)
Paper4. Student competencies in Supply Chain Management: Expectations and reality	European Journal of Contemporary Education 2023. szeptember (Munkácsi Adrienn)

1.3. Statement of the problem

Technological evolution has greatly influenced the composition of employment. The shortage of workforce in the supply chains is increasingly important, one of the possible reasons for which is that recent graduates do not have the appropriate competencies.

The rapid changes in practice and the researches and results in the logistics fields constantly challenge lecturers to improve their courses. They shed light on the fact that more focus should be on the integration of current topics and on the development of research skills in logistics courses. According to van Hoek (2001), logistics trainings have no market relevance, they lack the development of professional and practical skills, and students do not have research skills. Sauber et al. (2008) also points out the importance of training programmes that aim at the development of competencies. One of the many criticisms directed at education is that students do not receive marketable knowledge.

During a broad analysis of higher education logistics courses, Lutz and Birou (2013) established the need for a closer cooperation between industry and education, in order to be able to give courses that are more useful. In their opinion, relevant skills could be developed for the industry, with the use of more case studies.

According to Mayers et al. (2004), neither education nor experience, but only work-related skills, played a defining role in workplace success in the case of newly entrants and midterm employees. Thus, meeting the skills expectations of a specific field is much more important than education and experience. Further criticisms of education from companies are that students must first forget what they learnt in the classroom and then relearn real processes, which raises questions regarding the quality of education. We need to move away from teaching only from notes, relevant and recent topics must also be addressed, and then students can be prepared "debate partners" of the managers, and can bring new knowledge to the company that can help solve company problems.

It would be important to find an appropriate way to develop work-related skills, because so far the emphasis has been on the transfer of textbook knowledge.

Thus, lecturers of the 21st century must meet many criteria and challenges in a rapidly and continuously changing economic, social, and information environment. Students and potential employers define the toughest expectations and criteria.

In the research of Hortoványi et al. (2019), 14.450 job offers (published in the USA, by Indeed.com between 23.08.2018. and 07.09.2018.) were analysed. The following skills have proven to be the most sought after: social skills 36%: collaboration, (written) communication, conflict management, teamwork; information processing skills 22%: analytical skills, basic IT skills, digital media; leadership skills 20%; personal skills 19%: flexibility, creativity, problem-solving ability; ethical values 3%.

As a conclusion, it can be stated that social skills are most often mentioned as an expectation in job offers, followed by the category of information processing, including the digital competencies, suggesting that these skills are more and more coming to the fore. It is interesting, however, that professional knowledge/experience did not come up separately as an expectation, despite the fact that the availability of the necessary knowledge (know-how, knowledge) nowadays appears as a basic condition for an employee (Bak et al., 2019), since this is one of the most important criteria for a successful company. Furthermore, knowledge, as will be seen based on the definitions listed later, is part of the unit of four that make up the competency, therefore special attention should be paid to it.

Thus, what can be seen and is extremely important, that competencies are increasingly coming to the fore (its value increases) compared to professional knowledge, and the competency expectations are constantly changing, hoping for and creating new sets of competencies.

The existence and development of suitable competencies have become the basis both in the management field and in the organisation of higher education. The list of competencies that all students must possess in order to obtain the diploma and which can be read in each training's output criteria is a tangible proof of this.

Therefore, the biggest challenge for training institutions is to track down the new needs, expectations of the labour market, create and maintain a close cooperation with the concerned companies, pay attention to the changes, respond to them as quickly as possible, and equip their students with competencies that are suitable for the market demands (Thai, 2012). Thus, the goal is to train „marketable" students, which, in addition to transforming the training structure and redefining the training output criteria, also brings with itself the rethinking of the roles of lecturers. Therefore, my aim with my research is to help my training institution tackle these challenges successfully.

Based on conversations and interviews with employers, it can be said that the lack of workforce in certain SCM fields can be traced back to the lack of competencies of the employees, or to improper working conditions (offering a position that does not match the person's competencies). Therefore, I found it very important to examine also here in Hungary the competency expectations revealed in international research, and to inquire the employers about the competencies they expect from the graduates. The actuality and relevance of the problem to be investigated (competency gap between employers and employees) has been confirmed in OECD's (Organisation for Economic Cooperation and Development) Skill Strategy (2019) for the new life long learning system. The strategy declares that there is a need to: 1. develop a learning culture; 2. reducing skill imbalance; 3. strengthening skills use in the workplace; 4. strengthening the governance of adult learning; and 5. improving the financing of adult learning. Thus, here too, there is a competency gap between the needs of employers and the competencies of university graduates. One possible reason for this is that due to the rapid environmental transformation, educational systems could not adapt to the changes (Tindemans & Dekocker, 2020).

Considering the problems presented above, countless questions arose in my mind, such as what competencies employers currently expect from graduates due to environmental

changes. What possibilities do we have to develop students' competencies with the possible modification of the training plan or in accordance with that?

In the following, I present the research plan, research model formulated as a result of the listed problems.

2. Research framework

2.1. Research plan

The fast economic transformation and the daily changing expectations in the labour market are constantly challenging all three market participants (lecturers, students, and employers). In order to meet these expectations, all participants need to have, for instance, high degree flexibility, openness to learning and innovations, complex mindset, motivation, and agility (competency). All participants expect the education to be flexible, to want to change and adapt to the needs of the labour market, for which continuous communication, market monitoring is vital. Only those educational institutions that meet all these expectations can train students meeting the market requirements. It is important to see that lecturers taking part in training play a decisive role in this process, therefore, their information, updating of their preparedness, their educational methodological preparation and support came to the fore. Because of this, when exploring both the side of the students and the labour market is done, I would like to share the results and conclusions of my research with the concerned colleagues and would like them to participate in a development process, in which the training of 'marketable' students will become possible.

To realise the above-outlined research goals, as a first step, I determined the central research question, which is as follows. RQ: How can compliance with the labour market expectations be improved in the field of supply chain management, with the help of the competencies that must be developed according to the educational system?

The 'smaller' research questions, hypotheses, methods used, and results from publications (Paper 1-2-3-4), – which can be read in the research method section, are built on each other and all serve to answer this research question. In the following, I briefly present the existing synergy between the topics of the publications, which will be visualised in the research model section.

Paper1. We examined how familiar students are with the cooperative methods used in

education, and according to them how effective they are in developing competencies expected in the labour market. For the research, we used an online survey that was completed by two target groups: OKJ students in logistics clerk training and master's degree students in supply chain management training at Corvinus University of Budapest. Based on our results, OKJ students value cooperative methods more than MSc students, although the latter group has a bigger need for the competencies developed by these methods. It is a thought-provoking result that university students evaluated online applications as the most negative of all possible tools.

Paper2. Based on the student opinions appearing in Paper1, I went on analysing the methods with the help of factor analysis, for the purpose of assessing groupability, substitutability and efficiency. The variability of the applied methods plays an increasingly important role nowadays, since the more varied the tools in education, the more satisfied the student. As a result, we could establish the existence of consistency between the two training levels (OKJ-MSc) in assessing the effectiveness of the individual components.

Paper3. Its goal was – by comparing the literature and student opinions - to raise awareness of the competencies expected in the labour market and needed to be developed during training. We asked the MSc students attending supply chain management training at Corvinus University of Budapest their opinion about the competencies that are expected in the fields of SCM. We performed a significance test on their answers. The results showed a discrepancy between the expected competencies and those that students believed to be expected, with which perhaps the relevance of the competencies that can and should be developed in education and the rethinking of the training output requirements are brought to the fore in the field of supply chain management.

Paper4. Mapping the differences between employer experiences and competency expectations and using the inductive approach, it aims to help MSc students of SCM training who want to find employment in the field of the supply chain be more prepared. In 2021, middle managers from 64 companies filled in the online questionnaire, and with that shared the experiences about the competencies of recent graduates. The results shed light on the most expected competencies, the increasingly important role of soft skills, and the indicators showing significant deviations between the expected and experienced from the examined properties, such as complex mindset, systems approach, humility, and conflict management.

To answer the central research question, we examined the methods applied in education, the opinion and insights of students, and the experiences and expectations of employers.

Based on these, we can later make suggestions and recommendations when answering the question.

The synergies between the topics, research questions, and hypotheses presented in the research plan are illustrated in Figure 2.

2.2. Research model

The central research question (RQ): How can compliance with the labour market expectations be improved in the field of supply chain management, with the help of the competencies that must be developed according to the educational system?

With the help of the following Table 2. I present my research model, which illustrates the logical connection of the 'smaller' research questions and the hypotheses examined in the research plan presented above.

Figure 2. Research model
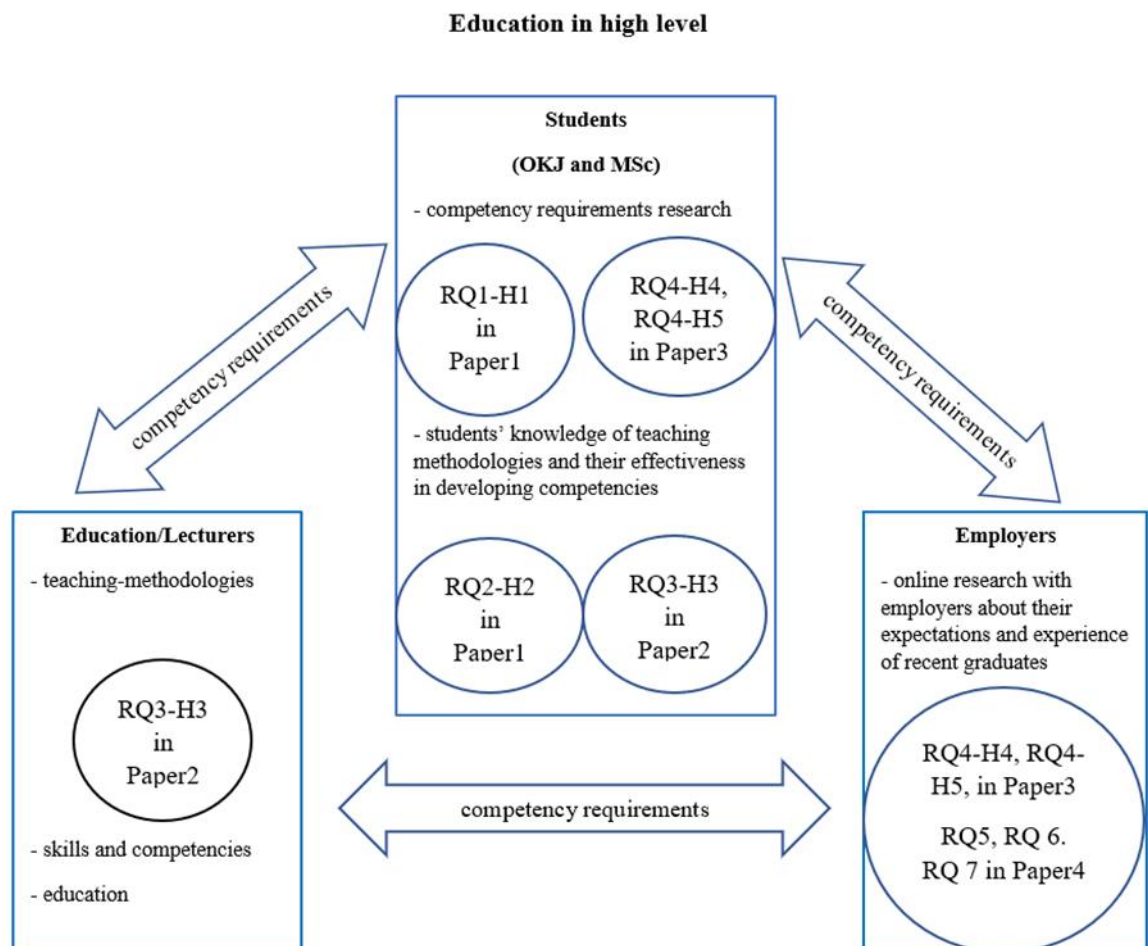
Source: own compilation

From the research model, it can be clearly seen that there is a close synergy between the topics, and therefore they all serve to answer the research question. Asking and analysing

the students' opinions (RQ1, RQ4, H4, H5) about competency expectations and methods applied in education (RQ2, H1, RQ3, H3), as well as their evaluation of effectiveness (H2), are all important in defining the training structure (training and outcome requirements). To perform well in the labour market and maintain the competitiveness of companies, it is essential – both from the student and the lecturer side – to get to know the experience and expectations of employers, to monitor them and to adapt to them. The experiences and expectations of the managers working in the supply chain fields were asked after personal contact, using an online questionnaire, which gave answers to the questions RQ5, RQ6, RQ7.

The concrete research questions and hypotheses are explained later on in the research method section.

During the research plan and the introduction of the research model, some theory and concepts arise that should be clarified for easier interpretation the researchmethodology. In the following, we provide the definitions of these theory and concept.

2.3.   Theoretical background and definitions

Education system

In order to „endow" students with appropriate abilities, skills, attitudes and knowledge, it is worth knowing the taxonomies and standards that have been and are currently affecting the methodology of the education system. Therefore, in the following part, I shortly present the history of learning outcome-based education, its current framework and the meaning of competency.

The focus is on the overview and clarification of competency and the concepts closely related to it, therefore, I briefly present not the full depth of the education system, but only the necessary framework that is closely connected to it and serves to make it easier to follow and understand, as well its elements and their building on each other.

Competency-based education, or learning outcome-based training, in the centre of which is Life Long Learning (LLL), already employed many researchers outside Europe in the 1960s. Traditional (cognitive, behaviorist) education took a turn in Europe only in the 2000s, recognizing the need to meet the expectations of the labour market. The knowledge-ability-attitude typology is associated with the name Bloom et al., a detailed description of which can be read in many (Bloom, 1976). Therefore, we do not go into details here, but we would like to note that they were the first to base their education on the cognitive, affective and psychomotor areas, which method later influenced all the

areas of training. The aim of this typology is that the potential employee can use the knowledge acquired in training in practice and link it with the expected competencies.

In the future, for us, the learning outcome-based education (called competency-based earlier) will be the guiding principle (the second of the two approaches mentioned above), which in addition to the transfer of knowledge and information, requires not only a facilitator and support role from lecturers, but also the prioritization of the students' needs.
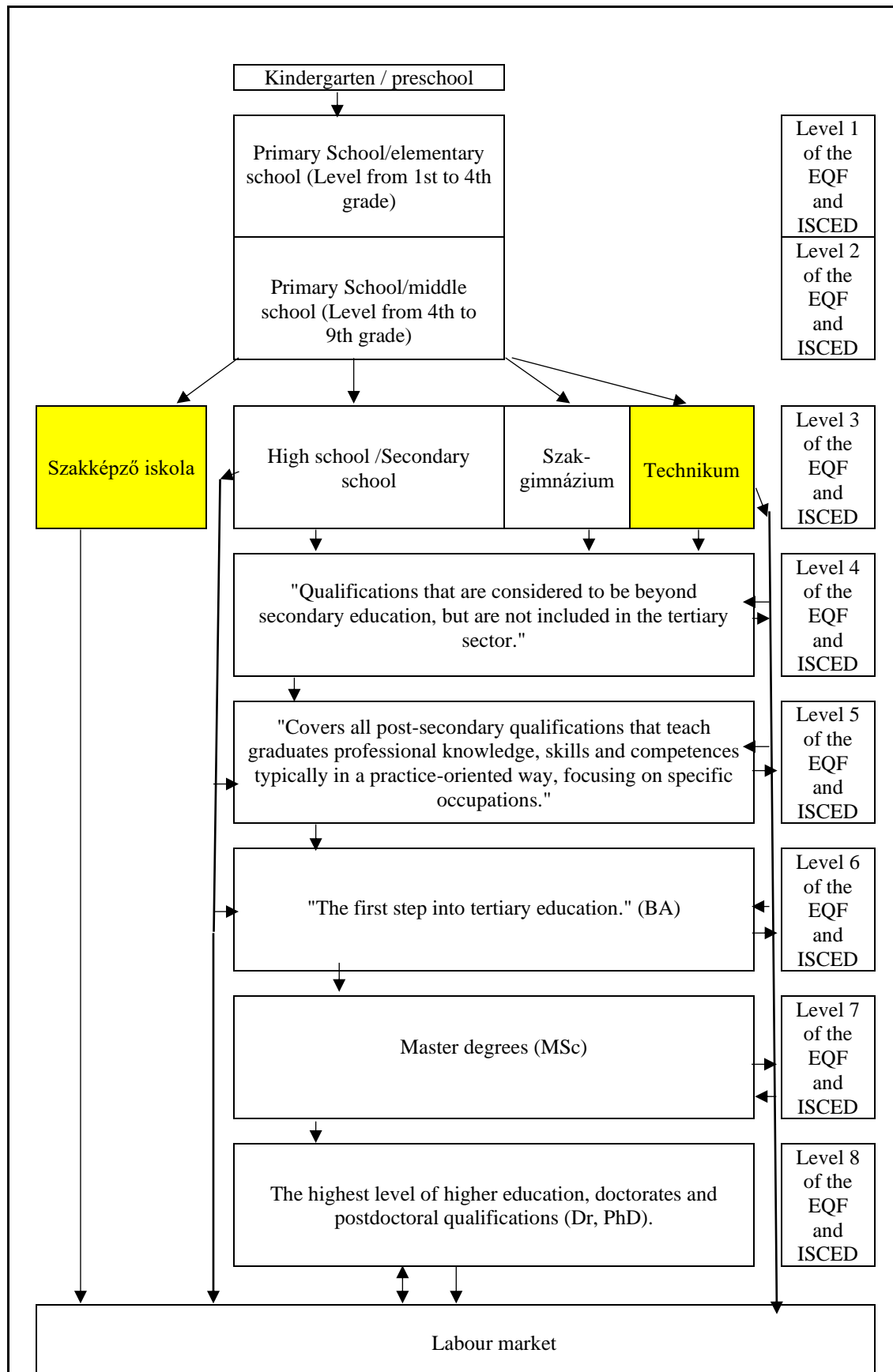
Competency components were defined at eight levels in the National Qualification Framework (OKKR: Országos Képesítési Keretrendszer), which explains the learning outcome-based approach as what the student should understand, know and be able to do at the end of his/her studies. Competency is defined as knowledge, skills and attitude, therefore the expectations of the eight levels are defined along these three components (Falus, 2009). The European Qualification Framework for Lifelong Learning (EQF) (Európai Képesítési Keretrendszer-EKKR) is closely related to this, as well as the two international frameworks governing education, the qualification framework of the European Higher Education Area (Európai Felsőoktatási Térség képesítési keretrendszere (EFTKK) (QF-EHEA) and the European Qualification Framework ((Bajzáth et al., 2017). The aim of the European Qualifications Framework (2008) is to harmonize qualifications available in Europe. Level 5-8 of the level-descriptor characteristics (8) applies to higher education. The four cycles of the qualification framework of EHEA consists of higher education vocational training (certain trainings of OKJ), bachelor's degree (BA-BSc), master's degree (MSc) and doctoral training (PhD) (Figure3.) Education World Wide Globally Recognized Study Programs are in accordance to European Qualification Format (EQF) and UNESCO ISCED 2011 Standard. (https://eduww.net/eqf_isced/)

ISCED: International Standard Classification of Education

In the 2020/2021 academic year, further changes took place, resulting in the separation of public education and vocational training institutions. In the public education institutions, the institutions teaching the fields of art, culture and pedagogy will be vocational secondary schools, and in the vocational training institutions, the technical and vocational schools will continue the former vocational secondary schools and vocational school courses in addition to the ascending system courses (KSH, 2023).

On the Figure 3. we can see the vocational training schools with yelow.

Figure 3.Education system and EQF in Hungary

Kindergarten / preschool		
Primary School/elementary school (Level from 1st to 4th grade)		Level 1 of the EQF and ISCED
Primary School/middle school (Level from 4th to 9th grade)		Level 2 of the EQF and ISCED
Szakképző iskola	High school /Secondary school	Szak-gimnázium	Technikum	Level 3 of the EQF and ISCED
"Qualifications that are considered to be beyond secondary education, but are not included in the tertiary sector."		Level 4 of the EQF and ISCED
"Covers all post-secondary qualifications that teach graduates professional knowledge, skills and competences typically in a practice-oriented way, focusing on specific occupations."		Level 5 of the EQF and ISCED
"The first step into tertiary education." (BA)		Level 6 of the EQF and ISCED
Master degrees (MSc)		Level 7 of the EQF and ISCED
The highest level of higher education, doctorates and postdoctoral qualifications (Dr, PhD).		Level 8 of the EQF and ISCED
Labour market		

| Re-education |
| Advanced training |

source: Own compilation

The role and responsibility of the lecturers

The role and responsibility of the lecturers is therefore huge, with which I fully agree, since they must not only simply teach the required knowledge material (training outcome requirements), but also do it in accordance with the students' expectations and prepare them for the labour market expectations. They have to train/educate responsible workforce, able to make individual decisions, while meeting numerous criteria. A lecturer, at the same time, supports and creates a connection between the past and the future and has to fulfill the role of a researcher, synthesizer, problem-detector and framework creator (Figure 4).

Figure 4. Stages of communication
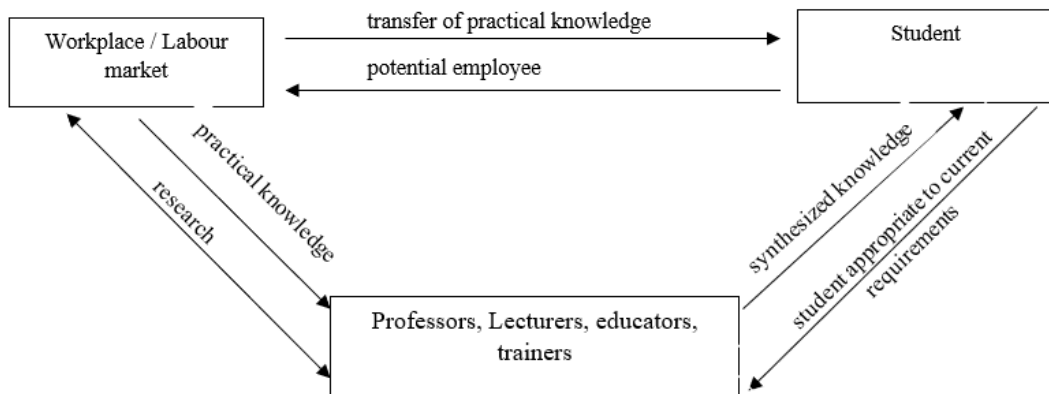
- facilitator: connection between the present and the future
- researcher: synthesising, abstraction, problem exploration
- constructor of frameworks

Source: own compilation

Even if he/she manages to achieve a goal or be successful with a new cooperatíve teaching method, it is not certain that the same method will be working the next time. The constantly changing environment, with the incoming stimuli, students and market expectations, and social challange, requires a great deal of flexibility, knowledge of educational methodology, suitability for Life Long Learning and commitment from a lecturer.

So, the cooperative method is one of the individual methods. Individual learning is the most well-known form of differentiated education, where students process the assigned tasks independently, and, if needed, get 'personalised' help from the teacher. Since they

process the material at the pace that suits them most, the acquired knowledge can be said to be certain.

Some definition regarding to Logistics and Supply Chain Management

The Council of Supply Chain Management Professionals (CSCMP), which used to be the Council of Logistics Management till 2004, defines supply chain management as follows: **"Supply chain management** encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies." (CSCMP website, 2023). The CSCMP also defines **logistics** as "part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements" (CSCMP website, 2023). Based on these definitions, the major areas of SCM are procurement, manufacturing (conversion), and logistics (including warehousing, distribution, and reverse flow activities). Based on research, competency-related studies usually cover the purchasing and logistics areas (Dubey et al., 2019).

'The logistics system is the system of material flows and stocks, as well as the information and management structure related to them' (Chikán, 2017, p.393).

The three main phases/fields of the logistics process, which separately can be interpreted as customer service cycle, are procurement (when the purchaser is the customer), production supply (the production is the customer) and the distribution/sales (when the external customer is the customer). (Chikán, 2017; Demeter et al., 2009).

The breaking point between each cycle, when the material does not flow, where stock accumulates, that is warehousing.

Competency definitions and theories

According to Falus et al. (2009, p.10) 'above all, it is worth seeing that **competency** – despite the chaos and debate around it – can be considered a useful concept which is able to bridge the gap between education and the world of work'. We collected from the competency definitions and theories found in the literature those that are the most relevant

to our research and which we examined from the approach of pedagogy, logistics-supply chain, and management.

Other definitions of competencies related to education can be classified into two larger groups. One definition group concentrates on the content and components of competency, while the other group rather expresses its aim, result, and application fields. For instance, one of the most basic definitions, most accepted and quoted in the European region, the definition of **Coolahan**, the expert of the **European Commission** defines the content of competence, according to which 'competency *should be considered as the general capability that is based on knowledge, experience, values and dispositions, and which a given person develops during learning'*.

Simon Buckingham Shum et al. **(2016)** defined **life long learning** as the competencies of the 21st century. They saw that educational institutions try to equip their students with knowledge that prepares them for life, and at the same time for continuous change and learning.

According to **Filipowicz (2011),** competency is a set of complex processes, the structure of which is shown in the following figure.

Figure 5. Definition of competency
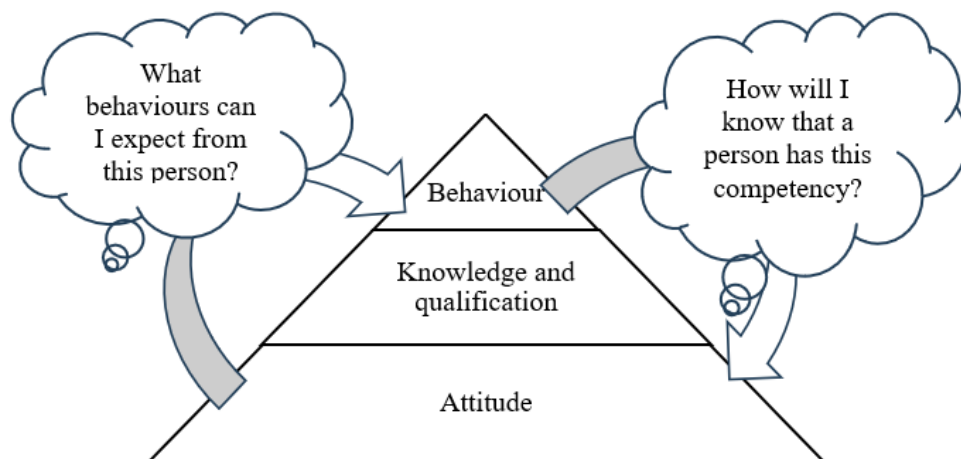
Source: Filipowicz (2011), own compilation

According to Figure 5. the lowest level of competency is attitude, based on which there may be behavioural expectations towards an employee. At the middle level, there is knowledge and qualification, and behaviour is built up on these two levels.

The following Table 1. contains those relevant competency definitions that help to broaden our horizons even more and are not included in the papers presented later.

Table 1. The most important content elements of the competencies presented

Authors	Definition of competency
Pató et al. (2021)	- 'The set of characteristics of an individual that - through the performance of work tasks - contributes to the achievement of organisational goals.'
Falus (2010)**, Bajzáth et al.** (2017)	A system of psychic formations that makes someone able to act successfully in a given field. - its internal components are knowledge, ability, and attitude - it is characterised by autonomy during activity, and the level of taking responsibility It is an entire system, which includes perception, internal psychic processes, the planning, execution, and assessment of an activity.
ESCO (2020), **EQF**	The proven ability to use knowledge, skills, and personal, social, and/or methodological abilities, in work or study situations, and in professional and personal development. They are described in terms of responsibility and autonomy. Although sometimes used as synonyms.
Losonci (2018)	-knowledge, skills, abilities, and attitude.
Felnőttképzési Törvény (A felnőttképzésről szóló 2001. évi CI. törvény, 29.§) **Adult Education Act**	-complex knowledge, which is based on knowledge, skills, abilities and attitude, a part of which is born with us, but a significant part can be learnt and developed through learning -it makes a person able to execute a task effectively, to manage a situation successfully -a set of knowledge, skills, abilities, behavioural characteristics that a person in adult education has, by which a person becomes capable to execute a task effectively.
Pedagogical lexicon (1997)	-a basically intellectual (cognitive) (***knowledge***) based trait, but motivational elements (**attitude**), **abilities,** and other emotional (attitudes) factors play an important role in it.
Sveiby (2001)	1/Business, economical interpretation: „the ability to create material or intellectual property. It consists of five defining, interrelated elements: *Explicit knowledge, proficiency, experience, value judgments, social environment* 2/Sveiby (2001): competency appears as intellectual property in his three round model, it is an element of knowledge capital, besides social capital and organisational capital. Therefore, the development of competency contributes to the development of knowledge capital.
Ellström and Kock (2008)	-abilities, with which a person can successfully execute a given task or job.
Green (2011)	-ability, with which we are capable of performing tasks at a high level.
Filipowicz (2011)	behaviour, attitude, knowledge, and qualification
Simon Buckingham Shum and Crick, R.D. (2016)	-defined competencies of the 21st century as the life long learning - educational institutions try to equip their students with knowledge that prepares them for life, and at the same time for continuous change and learning.

Source: own compilation

In the following tables (Table 2-3.), I present the existence of standard elements (knowledge, abilities, skills, attitudes) in the competency definitions by authors, divided into the fields of pedagogy and management (Paper 3. contains the part referring to the

supply chain field.) The 'x' mark is listed in the appropriate line, in case the given expression appears in the definition to the letter. In the 'others' line, I highlighted the elements that are not literal but can be classified according to their content.

Table 2. Definition of competency in the Hungarian pedagogical literature

Authors/ Competency Items	Knowledge	Skills, abilities, and attributes	Attitude	Others
Adult Education Law (2001. évi CI. törvény, 29.§)	x	x	x	
Bakos (1986)	x			responsibility authorisation proficiency (knowledge, skills)
Hungarian Institute of Public Administration (2006)	x	x	x	
NEFMI (Ministry of National Resources)	x	x	x	emotions, values and ethical characteristics (attitudes) and motivations
Pedagogical lexicon (1997)	x	x	x	
Falus et al. (2009)	x	x	x	motivation
Nagy (2007)	x		x	categories: personal (attitude), cognitive (knowledge, skills), social (attitude), and specific

Source: own compilation

Table 3. Definition of competency in the management literature

Authors/ Competency Items	Knowledge	Skills, abilities, and attributes	Attitude	Others
Losonci et al. (2018)	x	x	x	
Spencer- Spencer (1993)	x	x	x	a distinctive characteristic of the individual (attitude)
Sveiby (2001)	x	x	x	experience (cognition, knowledge), value judgements (attitude), social context
Ellström-Kock (2008)		x		
Green (2011)		x		
Filipowicz (2011)	x		x	Behaviour
Simon Buckingham Shum and Crick, R.D. (2016)	x			Life Long Learning (LLL)
Burgoyne (1988)	x	x	x	possessing the characteristics necessary for competent behaviour
Mansfield (2004)	x	x	x	

McClelland (1998)	x	x	x	Behaviour Event Interview, BEI

Summarising the recognitions that can be made in connection with the presented competency definitions, we can see that there is no unified position among the countless approaches. Yet, based on the concepts of competency that have been learnt, a mostly unified position seems to emerge regarding the necessary existence of competencies, abilities, knowledge, attitude, and other characteristics and components, which are to ensure the conditions for efficient and/or successful work. In addition to these, personality traits and/or personal characteristics also have a great influence on individual performance.

In accordance with the opinion of Henczi (2009), it can be said that: competencies are measurable and/or observable characteristics that distinguish outstanding performers from others in a specific work environment. It is a complex system that induces action, activity, and, in many cases, problem solving, which makes us able to successfully complete a certain task and continue a creative lifestyle.

As a summary, we can say that the expression **competence** marks basically those activity areas in which a given person is competent. These are such specific and observable methods of performing a given task which the individual is able to execute according to the requirements. In this case, the indication of a person's competences means the list of main tasks that a job has. This could be, for instance, the preparation of a presentation, writing a research article, etc. (Woodruff, 1993).

Table 4. Difference between the concepts of Competence and Competency

No.	Term	Main Focus	Definition
1	Competence Competences (ESCO)	Task-Job	Competences are the tasks a person is capable of performing.
2	Competency Competencies	Person	Competencies are the personal characteristics that make work performance possible.

On the other hand, the expression **competency** refers to personal traits that make a person able to do well in the field of competence. Competencies can be such attributes that make the optimal execution of a given task possible in a given organisation. All personal characteristics can generally be used in the workplace, independently of the nature of the

job or the level of performance that can be achieved using it. For example, a personal trait that makes a person able to give a lecture or write a paper.

In the following, I provide an overview of the concepts (e.g. knowledge, literacy, expertise, skill, ability, proficiency, attitude and taking responsibility) closely related and connected to the *concept of competency.* My goal is to clear the blurred borders of these concepts and remove the obstacles or differences that come from interpretation. Expression skill, ability, and proficiency can often be read as synonyms for each other, and their content is not clear. In the course of the interpretation of the key competencies, Eilström and Kock (2008), and Kotzab et al. (2018) as well interpret competency and ability as synonyms. Then there are cases when there is a difference made between these two concepts, and are handled based on their relationship to each other (e.g. the interpretation of the EU).

Internal components of competency

In the definitions of Bajzáth and al. (2017, p.121): „Competency is a system of psychic formations, which makes someone able to act successfully in a given field. Its internal components are knowledge, ability and attitude, is characterised by autonomy during activity, and the level of taking responsibility. '

In the following, we construct the meaning of the internal components, starting from this definition.

Knowledge

According to Falus et al. (2009, p.9) 'knowledge comes into being as an interaction between intelligence (ability to learn) and the situation (the possibility to learn), it is much more socially constructed than intelligence. Knowledge includes the foundational concepts and theories, as well as the tacit knowledge established in the framework of various activities. '

It is interesting to note that in the same place, 'understanding' is interpreted as the knowledge of why.

According to toBajzáth et al. (2017, p.30), knowledge 'refers to the *forms*, *facts,* and elements stored by the human mind during *experiences* and which can be reproduced and used from experiences'.

We can classify experiences based on their usability into declarative and procedural knowledge groups (Pajkossy 2010a, cited by Bajzáth et al. 2017).

EXPERIENCE →KNOWLEDGE ⟶ DECLARATIVE (a body of knowledge, facts and information that is consciously stored, can be recalled, modified, and used any time)

PROCEDURAL (the change that takes place in an individual through experience, the change in skills and abilities that affects the „performance").

Knowledge is organised into a complex system, its processing is helped by 'schemas', with the help of which cause and effect relationships are revealed in this cognitive system.

LITERACY (socially valuable knowledge) = SKILL+ABILITY+KNOWLEDGE (the sum of S+A+K that is relevant and usable in a given environment)

EXPERTISE = (expected in a specific field) SKILL+ABILITY+KNOWLEDGE (sum of) (Csapó, 2004).

Closely related to this is the question raised by Kinel et al. (2017), according to which it is very important to clear the meaning and distinguish the expressions knowledge, competencies, and qualifications. The following figure 4. helps in answering the question. The figure was published by Hertle et al. in 2015, and presents the relationship between the concepts mentioned before.

Figure 6. The relationship between the concepts of knowledge, competencies, and qualifications
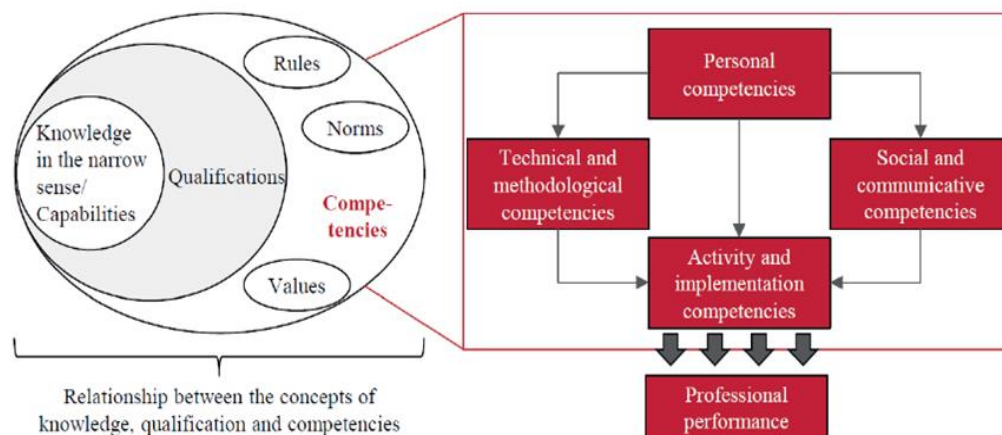
Source: Hertle et al. (2015)

Figure 6. clearly illustrates the view of the authors regarding the triple concept system, in agreement with which I would like to note that these elements are not the only ones that determine competency, as was also seen with the concepts of competency presented earlier. In addition, in the presented approach, the authors also marked four competency classes, such as

(1) technical and methodological competencies

(2) social and communicative competencies

(3) personal

(4) competencies of activity and implementation cognitive

According to their opinion, competency should be looked at as the relationship between the individual and the tasks to be performed within the professional work; consequently, you need knowledge and skills in order to execute given task successfully (Volpentesta & Felicetti, 2011). According to Falus et al. (2009), knowledge transforms into ability at the moment it becomes usable in practice.

But what does the expression 'ability' and 'skill' mean? Its use often gets mixed up with skill and proficiency; therefore, in the following, I present the relationship and connection, as additional components defining 'competency'.

Ability and skill

The literature gives countless definitions of the term ability, which we give an overview of in the following. The exact meaning is important to us because during training, emphasis must also be placed on the development of skills (beyond professional knowledge), which the employers expect and successful graduates (potential employees) will need.

The fact that certain **abilities** are born with us can be treated as a starting point, among which there are developable and less developable abilities. If we spend enough time and energy developing the necessary elements, they will become skills. Reaching this state is the goal, since if you no longer have to concentrate to use the given ability, this energy is released and can be used for other purposes. (E.g. if you do not have to concentrate on balancing while riding a bike, then you can admire the landscape). Mueller and Dweck (1998), Dweck et al. (2014), *the representatives of the mindset that abilities are developable*, during their investigations, identified two types of thinking regarding **self-**

efficacy. According to the fixed mindset, our abilities are given since birth, they do not change, while according to the growth mindset, they can grow / decrease depending on learning. The mindset anticipates the school performance. Programmes that promote growth mindset ('mindset training'), effort and better learning strategies, as well as transfer the benefit of social support, have also led to better endurance and course results in university education (Paunesku et al., 2015; Rattan et al., 2015). According to Dweck (2000), the perception of ability affects the *attitude*, behaviour, and reactions of both the person and the environment in learning situations.

With the help of Falus (2006), the meaning of the word skill, which was originally used for physical, then mental activities, in the Hungarian language, is equivalent to the term 'képesség', although it is used with three different meanings in Hungarian: skill, proficiency, or ability.

I will explain their content in detail below.

The **level of skill** is usually determined based on the accuracy and speed of execution of the activity performed.

According to Falus (2006), in the acquisition of the skill, not only the density of the exercises but the time allocated to them play an important role, but also the previously acquired knowledge and its use.

Reviewing the literature, in summary, we can say about the skills that they have the following meaning: **suitability, talent, physical-mental endowment, psychic property, individual level of preparation, level of performance, aptitude, personality trait**.

Since skills are closely related to their grouping methods, in the following, I will present their categorisation based on the different theories of some authors.

The grouping of skills

One of the most popular approach is the grouping according to the so *called soft and hard skills* (Wikle and Fagin, 2015). According to Williams (2001), most people easily recognise the difference between the training regarding hard skills (work with tools and softwares) and soft skills (interpersonal or intrapersonal focus).

So-called 'soft skills' are, for example, complex and critical mindset, advanced communication skills, and collaboration in social situations (Mihalkovné, 2014). In fact, it can be seen that these are the skills that – in case we pay attention – can be developed during training. Weber et al. (2010) determined soft skills as interpersonal and behavioural skills that are necessary for using knowledge in the workplace. According to

Robles (2012, p.454) article, soft skills are interpersonal properties, also known as people skills and personal qualities. Cimatti (2016, p.98) said that soft skills are all those skills that 'are not related to a specific task, but are necessary in every situation, because they appear mainly during interaction with people in the organisation'. According to Marando 2012, p.2) soft skills are *characteristics* such as communication, negotiations, handling, and influencing expectations, problem-solving, and decision-making. Soft skills are largely intangible, not linked to an actionable or concrete output, and are generally used without using proven techniques or templates. Balcar (2014, p.4) described soft skills as 'immaterial skills', which are hard to measure and closely related to the individual's attitude. In terms of work, Cleary et al. (2006, p.53) formulate a definition, according to which soft skills are 'employability skills that can be used in many jobs; therefore, by possessing these skills, an individual is able to fill other jobs at the company, too'. In the description of Laker and Powel (2011, p.112) soft skills are „intrapersonal skills, such as the ability of self-development, and interpersonal skills, for instance, how we handle interactions with others, while the so called hard skills are technical skills that include working with worktools, data, software, etc. Based on earlier literature, Elizabeth Rainsbury et al. (2002) calls hard skills the skills that are connected to the technical execution of tasks, and these generally mean the cognitive functions (Weber et al. 2010; Rainsbury et al. 2002).

On the basis of these, we can say that knowledge=hard skill.

According to Marando (2012, p.2), hard skills are 'technical in nature' and often involve the use of tools such as project scheduling software, spreadsheets, modelling tools, and the many available templates; therefore, we are talking about skills 'related to professional knowledge'.

According to Klaus (2010, p.3), while hard skills can be learnt and perfected with time, soft skills are harder to acquire and change. Hard skills indicate specific abilities to perform a specific job (Cimatti, 2016, p.98). On the other hand, according to Antalovits (2005, p.32) it is easier to recognise and identify the hard, i.e., technical skill appearing in the workplace due to their objectivity. But, at the same time, they are very specific, and it is difficult to transform them, and transfer them from one situation to another. Hard skill itself is the professional knowledge (CVonline.hu, 2019), it indicates the individual's qualification in the CV. These are the skills that are much easier to assess, they are much more tangible, and show a certain professional aptitude. According to the professional portal Businessphrases.net (2019), hard skills can be taught, are more definable and measureable than soft skills, and are more quantifiable. = (PROFESSIONAL)

KNOWLEDGE, KNOWLEDGE (ISMERET), Know-how; these are more likely to be linked to classical school education. Hard skills e.g., workplace skills, the ability to use typing, writing, maths, reading, and using softwares (Investopedia, 2019).

Skills and abilities are often used as synonyms for each other. In order to see whether we do it right, in the following, we look at the concept of **ability**.

We can say about **abilities** that – through our inhabited abilities – enables us to carry out a process, and if we practice this process enough, then we can carry it out automatically, by turning off awareness. Such as walking, speaking, driving a car, reading, writing, etc. Automation takes a lot of practice (Fimota,2003).

So 'if the activity does not require the direct input of consciousness, but the activity is carried out almost automatically, it is an ability, but if it is a question of solving a task realised by connecting a variety of knowledge and abilities when solving a complex task, then we can speak of a **skill'** (Falus 2010, p.7).

The concept of **proficiency** is closely related here, which is the sum of abilities and skills that already represent experience in a certain subject area.

PROFICIENCY=SKILLS+ABILITIES

Attitude

According to the definition of the European Union (2018) describes a **tendency** or **mindset** to act or react to ideas, people, or situations. Faragó (1997): Originally, in experimental psychology, it indicated readiness for action, point of view; nowadays it mainly means a permanent point of view, and evaluative point of view towards some concrete or abstract object (person, value, deed, etc.).

As a summary, in the following table I present the key concepts in relation to attitude, broken down by author.

Table 5. Definition of attitude

Authors	Attitude
Golnhofer (2010)	-evaluative point of view -components: affective, cognitive, and conative -predictors of behaviour;
Európai Unió (2018)	-tendency, -mindset
Faragó (1997).	-readiness for action, -permanent point of view, -evaluative point of view
Budavári-Takács (2011)	-aptitude for something, adequacy,

	-readiness for action
G. W. Allport (1979)	-readiness
D. N. Uznadze, (1886-1950)	-point of view

Source: own compilation

Based on the attitude approaches presented, we can say that 'point of view' and 'evaluative point of view' describe its meaning the most.

According to the definition of Dr. Budavári-Takács Ildikó (2011), attitudes are always dispositions consisting of cognitive, affective, and conative components, which appear in variable distribution depending on the given situation. The aim of the following self-edited figure is to illustrate the structure of attitudes as a summary of the literature presented so far.

Figure 7. The concept of attitudes assumes three components
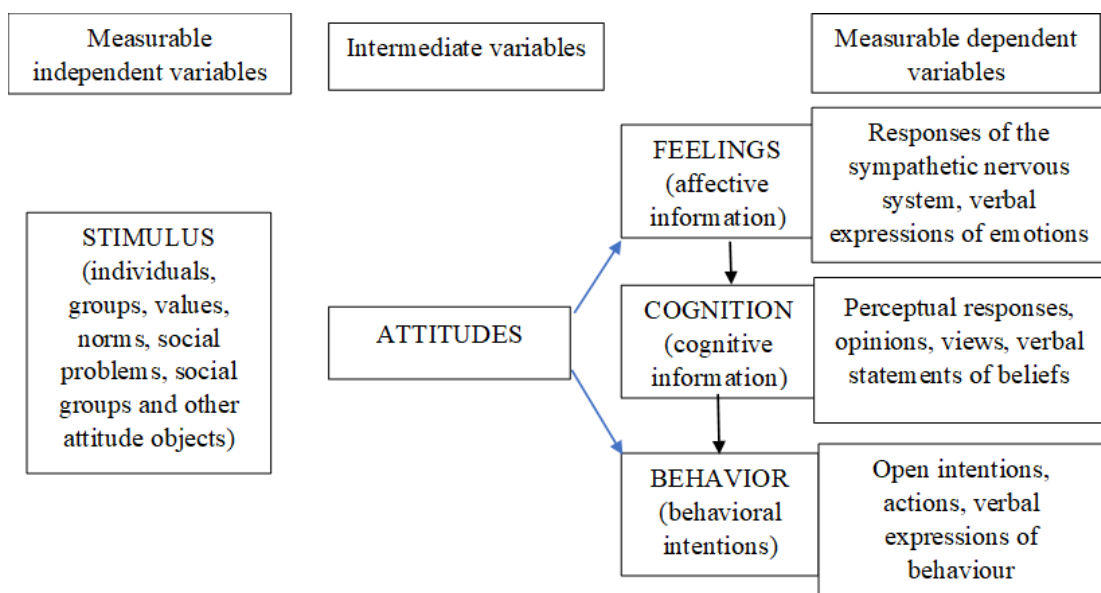
Source: own compilation, following Dr. Budavári-Takács (2011) and Golnhofer (2010)

Autonomy and assumption of responsibility

While I have presented the components of competency (knowledge, skill, ability, attitude) so far, now I must also define the fourth descriptor. When defining autonomy and the assumption of responsibility, we apply the approach of Bajzáth et al. (2017), according to which, by defining the individual's personality, it includes the following factors: independence, self-regulation, self-direction, reflectivity (also with respect to oneself), awareness (including the formation of professional identity), constructiveness,

cooperation in social situations, following norms and rules, its shaping and finally the assumption of responsibility.

In the following, we turn to a brief overview of competency models.

Competency models

The aim of creating competency models is to create a coherent system that helps the company achieve its strategic goals.

The Iceberg Model of Competence Defined by Spencer L.M. JR. and Spencer S.M. (1993)

Figure 8. Iceberg Model
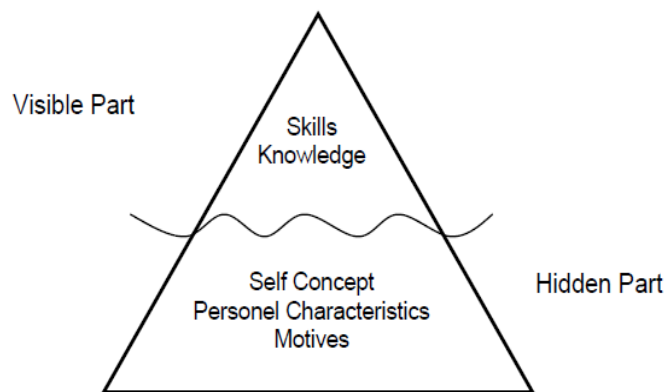
Source: Spencer and Spencer (1993)

Divides competency into two main parts, according to whether they are visible (easy to develop) or invisible (harder or not at all developable). While the former include expertise and skills, the latter are made up of attitudes, personal characteristics, and motivation, which form the basis of personality (Spencer and Spencer, 1993, p.15.). The iceberg model seen in the figure illustrates the structure of competency. Based on the model, we can see that knowledge and skills make up the so called elements above the water level, which are perceptible, while the elements below the water level consists of self-image, values, motivation, and personality traits, which are not directly perceptible. In the definition of Karcsics (2011), the competencies above the water level are easy to interpret, but as we move below the water level, it becomes increasingly difficult to identify the individual's competencies. Based on the opinion of Spencer and Spencer (1993), *the selection of a person for a given position is most effective, if the basis of the selection is the innermost personality, since professional knowledge and skills can be easily developed, which the given person can acquire more easily during the work and training process*.

Iceberg model of Competency, Spencer, McClelland and Spencer

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The above outlined iceberg model (Spencer and Spencer, 1993) is the basis of this model. Here, the authors did not focus only on the representation of visible and hidden qualities and abilities, but rather emphasised the elements of the conscious and less conscious levels.

Knowledge: possession of information, concepts, and theories about a specific field or job. It is the best predictor of what a person can/could do.

Proficiencies, skills, abilities: physical and mental aptitude for some activity or performance (skills), or learnt practice (ability), which include both analytic and conceptual thinking.

Social roles and values: that the person considers important based on their own values, such as career or self-realisation.

Self-image (identity), as the individual sees himself/herself, e.g., expert, leader. Self-confidence is a fundamental belief that one can cope with uncertain situations.

Figure 9. Components of competency
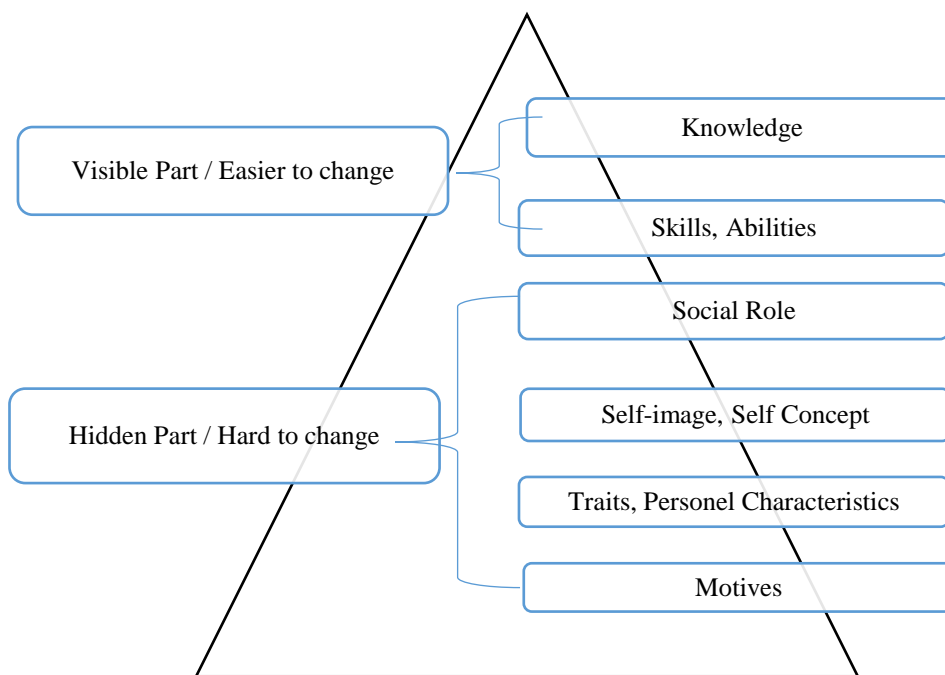
Source: Spencer et al. (1994); in Zhang and Yuan, (2022), own compilation

Personality traits: personal physical and psychological characteristics: reaction time, decision-making ability, self-esteem, etc.

Motivations: they steer behaviour in specific directions. They influence almost everything we do. The person motivated by performance sets challenging goals and assumes responsibility for achieving them.

We can see from the above that the various cognitive skills make up an important, but relatively small – and usually clearly visible – layer of competency, but in the depths, less conscious, emotional, social structures dominate.

Architectural model of competences Robert A. Roe

Figure 10. Robert A. Roe Architectural model of competences
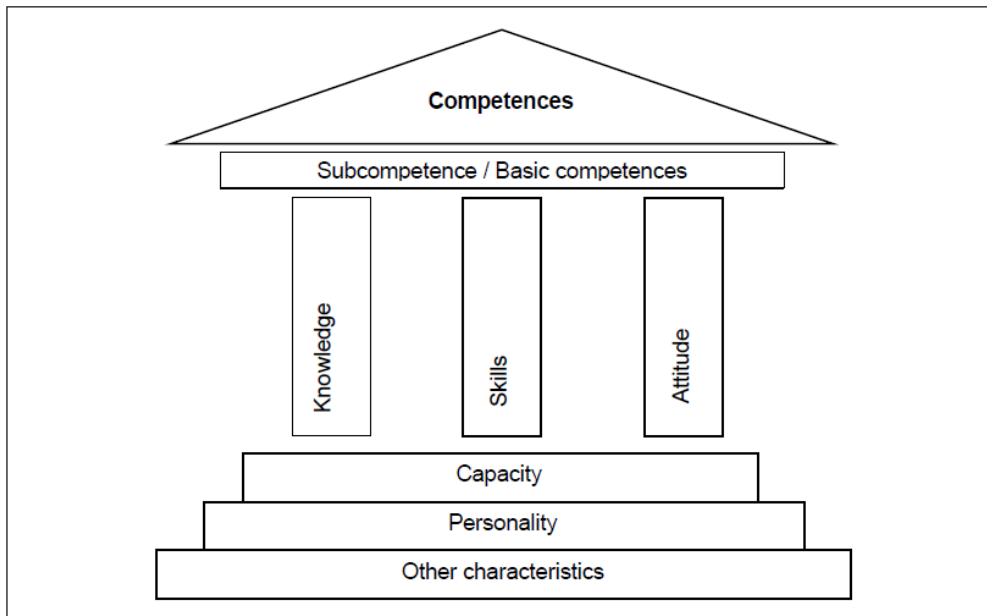
Source: Roe (2002)

The model has the form of a Greek temple and can be interpreted as follows:

Competences are based on sub-competences as well as knowledge, skills, and attitudes. These are created through the learning process in the actual (or simulated) work environment. On the other hand, knowledge, skills, and attitudes are created through learning processes that take place partly at the work place, partly at school, and partly in everyday life. Intellectual abilities, personality, and other characteristics determine what is learnt. Knowledge, skills, and attitudes (represented by the columns of the figure), therefore, were placed on the foundation of the church, while, on the other hand, they carry both the sub-competences and the competences themselves.

Based on the competence concepts and theories gathered and presented so far, I would like to use the following figure 11. to illustrate my own point of view regarding the relationships between the individual competence elements.

Figure 11. Factors influencing an individual's competence and their manifestations based on own conceptualisation

Personal characteristics		Organisational characteristics	Social-Economic Characteristics	COMPETENCIES	According to their manifestation, they can be
visible elements	knowledge	company competencies			cognitive
	skills	characteristics, and expectations of the job	environmental resources		
	attitude				social
					personal
invisible elements	autonomy and responsi-bility				funkcional/specific

Source: own compilation

With the competency model set up based on my own idea, I tried to make the connections, relationships, and forms of appearance previously presented the simpliest, yet most comprehensive, and at the same time reflect my own experiences and opinions. The definition of Rakaczkiné (2008, p.16-17) had the greatest impact on me, which I think I can also see in this representation, and which defines competency as intelligence that includes knowledge of **'how'** in addition to knowledge of **'what'.**

Furthermore, it includes:

mobilising knowledge in problem situations,

cognitive and practical skills,

social and behavioural components and attitudes,

feelings and values.

The competent person is not only capable of something, but at the same time:

committed to action,

feels responsible for her/his own actions, and

wants to put herself/himself in a position to act.

A passive person can also have skills and abilities, **but a competent person is a performer.**

In the following, I describe the methods applied to answer the individual research questions and hypotheses, which help to interpret the elements in Figure 2.

2.4. Research method

First, as a summary, with the help of Table 6. I present the methodology used for the collection of necessary data, followed by the relevance and justification of the individual research questions and the techniques used for answering them.

Table 6. Summarised research methodology.

Methodology of data collection	Application of the data
Web-based questionnaire 110 OKJ-SCM-MSc Students (primer data)	Paper 1, 2, 3, 4
Web-based questionnaire 64 SCM-Employers (primer data)	Paper 4
Interviews with 5 Professionals (primer data)	Paper 4
Interviews with 3 Students (primer data)	Paper 1
Webinars, conferences, professionals, experts presentations (primer data)	Paper 4
Systematic Literatures review (secondary data)	Paper 1, 2,3,4

source: own research

The central question of our research is the examination of the competencies from the aspect of the student and the employer, so the necessity of this question (RQ1) is not in question.

To find out the answers, we used mixed methods, which means the use of secondary and primary information, and qualitative and quantitive methods. We gathered the data with the help of online questionnaire (primary, quantitative), and literature analysis (secondary, qualitative). Our aim was to increase the reliability and validity of the data, by building the methods on each other and combining their advantages. Through an in-depth study of the literature, and interviews with experts we created the basis for the questions in the questionnaire, which help us to answer our research questions. questions.

As an additional check, we did statistical tests e.g. Man-Whitney U test, content analysis, sign.analysis, principal component analysis, and interviews with students on the results, in order to support the reliability even more.

I share the results of the research with detailed information in the relevant sections of the publications.

The following table summarises the database of Paper1 és Paper2.

Table 7. Database for RQ1, RQ2, RQ3 and H1,H2,H3 in Paper1 and Paper2

			Gender		Age		
	Person	Person	Female	Male	18-26	27-30	30-
Data collection (2017)	OKJ:30 (35%), MSc:56 (65%)	86	61(72%)	17(28%)	77 (90%)	0	9 (10%)

Source: own research

In Paper1. 'Competencies of logistics and their potential for development', based on the competency expectation found in the literature, we have asked students in the logistics field about the expected competencies in the labour market, as well as about the familiarity and effectiveness of the educational methods used to develop competencies. Since the market expectations are constantly changing, and students have to meet these expectations, for the realization of our subsequent process development goal, as a starting point, we found it important to get to know their opinion. As this kind of research has not been done yet, the results are suppletory. We defined two questions (RQ1, RQ2) and two hypotheses (H1, H2) for our research, and the data collection and data analysis methods used to answer them are shown in the following table.

Our hypotheses (H1, H2) are connected to RQ2.

RQ1: According to the student, what competencies should a professional working in the fields of the supply change (procurement, manufacturing, warehousing, distribution) have?

Table 8. Methodology for RQ1

Methodology of data collection		**Methodology of data analysis**
Primer data	Secondary data (SD)	Content analysis
Web-based questionnaire (86)	Literatures review	Q method
		sig.analysis

Source: own research

RQ2: What kind of (digital) educational methods have the students met during training that helped them develop the competencies expected by the employers, and how efficient these methods were according to them?

H1: Master's degree students know the cooperative methods more, than OKJ students do.

H2: Master's degree students find the cooperative methods more useful, than OKJ students do.

Table 9. Methodology for RQ2 and H1, H2

Methodology of data collection		Methodology of data analysis
Primer data	Secondary data (SD)	Content analysis
Web-based questionnaire (86)	Literatures review	Q-method
Interviews with student (3)	KKK (learning outcomes criteria)	Mann-Whitney U test

Source: own research

It is extremely important to get to know the students' opinion regarding the educational methods and their effectiveness in order to achieve the subsequent process development goals. The adequate development of the necessary competencies can only be realized with the cooperation of the students. This also requires knowledge of this information. We chose the applied methodology based on what was described above, and we supplemented it here with personal student interviews to verify the results.

In Paper2. „Analysis of educational methods developing expected competencies in the logistics field by factor analysis", I examined whether the cooperative methods used in education (the familiarity and effectiveness of which we already know) could be arranged in groups based on the students' opinion, are they interchangeable, do they replace, support or complement each other. The answer is also important, because by knowing the ability of competency development of the listed methods and by making use of its variability (those who join the given group/component are able to develop the same competency) classes can be more colourful and interesting, in addition to the development of the expected competencies. This way both students and lecturers reach their goals easier.

RQ3: According to the students' opinion, how can the individual educational methods be grouped with the help of substitutability, interchangability, support ability, or complementability using principal component analysis?

Table 10. Methodology for RQ3, H3,

Methodology of data collection		Methodology of data analysis
Primer data	Secondary data (SD)	Content analysis
Web-based questionnaire	Literatures review	Q-method
		principal component analysis, Mann-Whitney U sig,

Source: own research

Since students from two different levels (OKJ-MSc) answered the questionnaire, which assumes that they do not have to meet the same expectations, I had the following assumption:

H3: There is a difference between OKJ and MSc students in the assessment of the methods belonging into the principal components.

Based on the earlier gathered data, I complemented the image of the cooperative educational method with principal component analysis. I also checked the significance level of the Man-Whithney test. As a result, we can say that it was worth to make the analysis and to create the components, because the hypothesis was only partially confirmed. Based on this, we can state that the methods of online applications, situation game, short videos, teamwork, project method, conversation with educational purposes, debate and group home work were rated as more effective by OKJ students from the aspect of developing competencies that important to employers.

In Paper3 „Competencies required for the implementation of an efficient supply chain from the perspectives of students and the labour market", my aim is to expand the horizon of students with comparing their opinion with national and international research results. The importance of the examined question (RQ4) is proven by the fact that changing or supporting student opinions can greatly help shape the training of the previously mentioned marketable student, both in the terms of the output and training requirements, their competencies to be developed, as well as the applied methodology. If the student knows the expectations of the market and the methods for meeting these expectations, according to experience shows more commitment in his/her studies.

Therefore, RQ4 is: Is there any difference in the assessment of the competencies expected in certain fields of the supply chain between recent international labour market research (EU, ESCO) and students in supply chain management training at Corvinus University of Budapest (CUB)?

We questioned 110 supply chain management (SCM) master's degree (MSc) students from CUB and performed a significance test on their answers.

Table 11. Database for RQ4 and H4, H5 in Paper3.

	%	Person	Gender		Age		
			Female	Male	21-23	24-26	27-30
I. data collection (2017)	49	54	40	14	10	44	0
II. data collection (2020)	51	56	35	21	28	26	2
Sum	100	110	75 (67,6%)	35 (32,4%)	38 (34,6%)	70 (65,38%)	2 (0,02%)

Source: own research

Table 12. Methodology for RQ4 and H4, H5

Methodology of data collection		**Methodology of data analysis**
Primer data	Secondary data (SD)	Content analysis
Web-based questionnaire	Literatures review	Q-method
	EU, ESCO	sig.analysis

Source: own research

In order to answer the hypotheses (H4, H5) compared to the data found in the literature, significantly more was achieved, since the students had to give their answers on a scale from 1 to 100, which can also be called suppletory. The significance test conducted on the data helped with the comparability of the results and the support of the hypotheses, which were as follows: H4 Students know that the most important labour market expectations of a logistics manager are systems approach and management/leadership skills, which stand out significantly even compared with the assessments of the other managerial positions.

H5 Students know that the most important labour market expectations of a purchasing manager are negotiation and communication skills, which stand out significantly even compared with the evaluation of other managerial positions.

In the light of our results, we accepted the H4 hypothesis. Furthermore, after a significant decrease in value assessment was shown in communication skills, negotiation skills, conflict management and networking skills compared to the purchasing manager, we also accepted the H5 hypothesis formulated in relation to the requirements placed on the purchasing maanger. Therefore, the significantly higher values of negotiation and communication skills for the purchasing manager support the students' awareness of the labour market expectations.

In Paper4 "Student competencies in Supply Chain Management: Expectations and reality", I examined the following research questions:

RQ5: Which competencies do employers expect from graduated students?

RQ6: Which competencies are experienced by employers?

RQ7: Where do employers see discrepancies between their expectations and the current competencies of graduated students?

The constant and synchronous labour market shortage and unemployment in the fields of the supply chain management created the relevance of the research. Its significance is even more increased by the fact that national research is not available regarding this topic, even though the importance of cooperation between industry and education is increasingly coming to the fore. Taking into account the results of this research, the gap between supply and demand in the industry can perhaps be reduced to a small extent. For the research, I interviewed managers working in certain fields of the SCM with an online questionnaire after contacting them personally. The chosen managers often manage at the same time several fields, which gives their answers even more weight. There was altogether 101 answers, the distribution of which you can see in table 12. The applied methodology is shown in table 13.

Table 13. Database for RQ5, RQ6, RQ7 in Paper 4.

Procu-rement	Ware-house	Manufac-turing	Distri-bution	Reverse	Logistics and distribution managers	Other fields of SCM	Sum
12 (12%)	20 (20%)	10 (10%)	17 (17%)	2 (2%)	27 (26%)	13 (13%)	101 (100%)

Source: own research

Table 14. Methodology for RQ5, RQ6, RQ7

Methodology of data collection		Methodology of data analysis
Primer data	Secondary data (SD)	Content analysis
Web-based questionnaire	Literatures review	Q-method
Interviews with professionals	EU, ESCO	sig.analyse
Webinars, conferences, professional's presentations		

Source: own research

Since the willingness of the surveyed sector to answer is very low, it was necessary to visit them personally, as a result of which they managed to fill in the online questionnaire. The round table discussions, lectures and personal interviews held at the conferences all

strengthened and supplemented the information found in the literature. This supported the relevance of the competencies examined in our questionnaire and helped answer the research questions. With the significance test performed on the results, we achieved the comparability of the data and the answer to our research question.

The following table 15. helps to review the method of participation of the stakeholders in the research.

Table 15. Research methods from the aspect of the stakeholders

Questioning of the students	Questioning of the employers	Educational system, Activation of lecturers (plan)
With online questionnaire (sharing the link of the questionnaire in FB groups and Teams)	With online questionnaire (Sending in e-mail, sharing on LinkedIn)	Students' opinion about the educational methods. Personal presentation of the research results: on research forums, meetings, round table discussions.
With personal interview	With personal visit, guest lecturers, thinking together	With sharing the research results orally and through publications
Plan: thinking together		Plan: thinking together, planning the development processes with the active participation of lecturers

Source: own research

I will use thinking together and the development and creation of processes in the field of „action research", as a further possible step in the research. The thinking together with students – lecturers – employers, the round table discussions, participation in fourms all served as validation of the research results.

2.5. Conclusions

Based on my researches I arrived to the following conclusions.

Most of the expected competencies revealed by literature can be developed in education, which justifies the knowledge and use of these and the cooperative teaching methods also in teaching circles. Master's degree students are also familiar with the examined methods, which helps them acquire the skills and abilities expected in the labour market. The methods can be flexibly adapted to all levels of training, e.g. OKJ-MsC, since most of the examined competencies can be considered general. Based on the opinion of students, with online learning applications the problem is not necessarily with the methodology, but rather with its application method and possibilities. As a result of successful pairing (competency to be developed – method) the required competency is attainable at an

appropriate level, and since the methods belonging to each component are interchangeable, they can be used as a supporter and complement of each other, providing the user with a high degree of flexibility. According to the assessment of master's degree students, the methods belonging to the first main component for the development of competencies related to comprehensive logistics within the company (teamwork, situation game, short videos, project method, debate, conversation with educational purposes, online – study supporting – applications, group homework) are less suitable for the development of expected competencies and only here we can observe a differentiated assessment of the effectiveness of the methods. In my opinion, if these methods were used more often in classes, students could re-evaluate the effectiveness of thesse methods and the efficency could be moved in a positive direction. Our results showed the discrepancy between the expected competencies and the competencies that were thought to be expected. Presentation skill showed the most surprising result. So there are fields and competencies, the importance of which students should be made aware of and developed in order to become marketable employees.

The competencies determined by ESCO can be classified under the 17 competencies we examined from the fields of procurement, manufacturing, warehousing, distribution and logistics. So the 17 competencies function as umbrella terms. Thus, these groups have become inclusive of several operations/activities, with the development of which we can help our students achieve success in several fields in the labour market. Most of the examined competencies are skills and abilities, which can be said to be generally expected from managers, therefore in secondary and higher education institutions, more and more attention must be paid to educational methodological issues. By clarifying these, the development of increasingly important soft skills can be realized even more.

According to the research conducted in the labour market, we can say that the most expected competencies are positive attitude, agility, motivation, openness to innovation and change, scheduling skills, (work related) time management, curiosity, ability to use softwares and IT tools, ensuring of cross-department cooperation. These expected competencies reflect the dynamic changes in the environment, which require flexibility and fast adaptation from the employees. In addition, computer skills have become highly important due to the digital transformation of the entire economy. The least expected qualities were mainly managerial qualities, such as ability to train people, ability to make forecasts (financial, dividend, economic trends), management skills, ability to build professional networks, ability to create contracts, ability to facilitate recruitment. In our

opinion, these competencies are best developed on the job, and recent graduates usually do not start as managers, so these skills are not expected of them.

According to the experience of the employers, students showed the best performance in terms of ability to use softwares and IT tools, curiosity, positive attitude, agility and openness to innovation and change. It is an important result that self-confidence is also relatively strong. Based on the significance test, with the exception of six competencies (ability to facilitate recruitment, ability to administrate, self-confidence, ability to make forecasts, ability to create contracts, ability to build professional networks) there is a significant difference between expectations and experiences.

In the following, you can read some suggestions in view of the use of the results.

2.6.   Reccomendation

Based on our research results, it is worth considering paying more attention to educational methodological issues, since today's students expect something completely different – mainly immediately usable knowledge – in an attention-grabbing way. If we involved them in the rethinking of the training output requirements, or in the development process of competencies (e.g. workshops), their horizons might broaden even more and their commitment to learning would increase. The suggestions and ideas made by them would not only require a deeper level of knowledge of educational methodologies, but also an overview of the results conducted on the labour market. Therefore, I would first inform them of the information necessary to make recommedations, such as research results, and educational methodology. The proposals would be evaluated individually and jointly by lecturers and company specialists (from the fields of supply change management), and the best could be implemented in the curriculum.

The involvement of lecturers in the transformation process (e.g. with round table discussions, thinking together), after the presentations of the results, can on the one hand help them to choose and apply the competency development methods used in the classes, on the other hand, it can increase the effectiveness of the training and help adapt the students' ideas to market expectations, so it would be easier to create harmony between the parties. In the meantime, the methodological support of the lecturers would be continuous.

It would be extremely important to involve the dual partners and other relevant company managers in the development process, because if the goal is to train marketable graduates, then on the one hand, they should know the students' perceptions regarding what is expected of them, and on the other hand, they could make their real expectations known

to the students. There are countless forms of networking, such as guest lecturers, company visits, open days, involvement of company experts in the curriculum, solving company case studies, joint problem exploration, analysis, solution, workshops inclucing company experts, gamification, participations in professional competitions at university, national and international level etc. Thesec an help broaden students' horizons about expected expectations, and employers can prepare to welcome newly graduated students, e.g. with targeted trainings and a mentor program.

The following suggestions are aimed for the further development and addition to the conducted research.

2.7.   Further research

One further step of the research examining the competencies could be including the bachelor's degree (BA), or the supply chain specialization, which would create an opportunity to learn about the differencies between bachelor's and master's level training. In this way, we could find out why it would be worth for a student to stay in training for another two years after completing the bachelor's degree. It would also help employers to let young employees go to the master's level, or enroll them, or to pay higher salaries to those coming from there.

It would also be interesting to examine the impact of artificial intelligence, IoT and digitisation on the development of competencies, and labour market expectations. Questioning the fellow lecturers and voicing their experiences about students' competencies and market expectations is also a possible way to further develop research. The promotion of cooperation between industry and education could be possible by continuously monitoring the market and comparing the experiences of lecturers and students, even within the framework of research.

The employer research could also be extended to either educational levels or to the levels of filled positions, both on national and international level. It would be important to know the expectations according to the educational levels.

Finally, in the next section, you can read my publications published so far in the topic, which are the basis of the research framework presented earlier.

3. List of papers

Paper 1. Munkácsi Adrienn – Demeter Krisztina (2019) Logisztikai kompetenciák és fejlesztési lehetőségük az oktatásban (Competencies of logistics and their potential for development) Vezetéstudomány/Budapest Management Review L . Évf. 2019. 7-8. Szám/ Issn 0133- 0179 Doi : 10.14267/ Vez Tud.2019.07.05

Paper 2. Munkácsi Adrienn (2020) Logisztikai területeken elvárt kompetenciákat fejlesztő oktatási módszerek elemzése faktoranalízissel (Analysis of educational methods developing expected competencies in the logistics field by factor analysis)
Logisztikai trendek és legjobb gyakorlatok folyóirat, VI. évfolyam 2020. 1.számában)

Paper 3. Munkácsi Adrienn (2021) Competencies required for the implementation of an efficient supply chain from the perspectives of students and the labour market (A hatékony ellátási lánc megvalósulásához szükséges kompetenciák hallgatói és munkaerőpiaci szemszögből) Budapest Management Review LII. évfolyam 2021. 5. szám

Paper 4. Munkácsi Adrienn (2023) Student competencies in Supply Chain Management: Expectations and reality (Hallgatói kompetenciák az ELM területén: Elvárások vs. valóság) European Journal of Contemporary Education 2023. 12(3)

Contribution Report

Paper 1. Main Author. Primary contributor to conceptualisation, methodology, literature review, data collection, formal analysis, manuscript draft, manuscript review and editing.

Paper 2. Main author. Primary contributor to conceptualisation, methodology, literature review, data collection, formal analysis, manuscript draft, manuscript review and editing.

Paper 3. Main author. Primary contributor to conceptualisation, methodology, literature review, data collection, formal analysis, manuscript draft, manuscript review and editing.

Paper 4. Main author. Primary contributor to conceptualisation, methodology, literature review, data collection, formal analysis, manuscript draft, manuscript review and editing.

3.1. Paper1. Competencies of logistics and their potential for development

Abstract

There are relatively few studies focusing on employee competencies required in logistics. These national and international researches collected those "general" and "specific" competencies that are required by employers. In our article we connect the competencies with the educational methods used in logistics programs.

The subject of our research was to determine from the students' perspective which cooperative educational methods are effectively developing competencies.

We used online questionnaires for data gathering, which was filled in by two target groups: students participating in logistics administration in adult training – called "OKJ" in Hungary – and students attending supply chain management at university masters level. Our results show that OKJ students value the cooperative methods more than university masters students, although the competencies supported by these methods are more necessary for the latter group. It was thought-provoking to learn that among all the educational tools, online applications got the most negative ratings from university students. This phenomenon was investigated further in our study.

Keywords: expected competencies, development of competencies, logistics, education, cooperative teaching methods, performance

Introduction

Hungary is in the centre of Europe, as a result of which, numerous important logistics routes pass through it and several international logistics companies are present with their services in the country. In addition, the Hungarian manufacturing sector itself is growing: according to KSH's annual time series current price data between 2001-2017, the production value from 12 589 billion forints (2001) grew to 30 578 billion forints in 2017, there was some relapse only during the economic crisis (http://www.ksh.hu/docs/hun/xstadat/xstadat_eves/i_oia002.html).

Therefore, it is easy to foresee that more and more well-trained professionals are needed in the fields of logistics and supply chain management. But, what abilities do these professionals need?

With the accelerating development of economy, technology and society; the growth of complex tasks, and the spread of digitalisation and internet information facts quickly become obsolete. Therefore, in today's complex world, which is interwoven with interdependencies, in order to manage well, above the profession-specific knowledge, there has to be emphasis on the development of the so-called soft skills during training. These are for instance the complex mindset, developed communication skills and collaboration skills in social situations (Mihalkovné, 2014).

These are abilities that – at least still for some time – cannot be replaced by machines. Other authors also arrived to the conclusion that the set of competencies required from logistics and supply chain managers is very versatile (Thai et al., 2011; Derwik et al., 2016, 2017; Flöthmann and Hoberg 2017). Hoberg et al. (2014) directly called them „decathletes".

Earlier researches (Patóné, 2006; Keller, 1999; Gibson et al., 1998; Myers, 2004), also reflecting on some highlighted tasks of logistics, explored in detail which competencies a logistics expert has to have in order to achieve and maintain the success and competitiveness of a company.

In our research, based on these detailed competency criteria, we asked students participating in secondary and higher education (OKJ and MSc) in the logistics field, about their awareness and the usefulness of cooperative methods in education.

We were curious about what competencies they believe potential employers expect of them.

It is important to see how students on different levels of education think about each method's usefulness. Is there any significant difference between OKJ and MSc students? Since the areas of activity and responsibility, the professional expectations of the later work positions will typically be different, it requires the development of different competencies, and thus it is expected to require the use of different methods during training (McKinnon et al., 2017). For instance, in the course of work, administrators most possibly do not, while managers do need to make decisions, for which the development of complex vision and effective decision-making ability is a highly important field in Masters degree level.

It supports the importance of the research that although there is international literature (Thai et al., 2011; Derwik et al., 2016, 2017; Flöthmann and Hoberg 2017; Hoberg et al., 2014) about the expectations towards a logistics manager, about the professionals working under them eg. manufacturing managers, operational purchasers, logistics administrators there is none, and in Hungary there is in general no recent literature about

the topic. However, the economic changes, the vague criteria and expectations of science and business life make it necessary to update the information regards to the labour market expectations. Moreover, in the professional literature there is no study like the recent one, which is based on the students' opinion. However, not only employers' expectations but also students' opinion about these expectations influence how useful they consider their training to be.

The more the training is in accordance with the expectations, the more energy they are willing to invest in studying, which is one of the fundamental conditions for the effectiveness of the training. Current study can be used as a possible starting point for further researches.

In the article, based on the results of earlier researches, first we present the competency expectations in the sub-systems of logistics. Afterwards, we give an overview about the methods of competency development.

Then we turn to the research, in which – with the help of questionnaire and the verification of some results – we examine if there is any difference between the assessment of the methods between the OKJ and the Masters degree students, and in case there is, then what causes this difference. Finally, we close our article with a summary and the conclusion.

About the logistics' competencies in general

In the last 30 years, there is a profound change in the fields of logistics and supply chain, which also modified the set of expectations of those working in logistics.

Nowadays, a successful logistics manager has to have business, logistics and management skills as well as professional knowledge (Thai et al., 2011). The daily complex tasks require complex vision and mindset; skills in the fields of business, in strategic decision-making, in communication, in management; intercultural, analytic and IT skills (Flöthmann and Hoberg 2017). Based on these expectations, today's logistics managers can be called "decathletes" according to Hoberg et al. (2014).

Derwik et al. (2016, 2017) in their research explored – with observation and interviews (applying the triangulation technique) - the necessary competencIes of the managers in the supply chain, and compared them to the results of earlier researches. As a result, they listed the competencIes in five big categories as follows:

(In the parentheses, you can see the proportion of the usage of each competency group in the daily activity and decision-making of managers):

1. business managerial competencies (dynamic awareness, business and stakeholder management) (observations 30–40%),

2. generic competencies (communication and cognitive abilities) (20–30%),
3. behavioural competencies (intrapersonal and interpersonal) (15–30%)
4. functional competencies (technology, administrative routines) (5–20%).
5. supply chain management expertise (supply chain management areas of expertise and applied analyses) (0–5%)

The investigation supports the idea that the profession-specific knowledge is the least important in a manager's daily practice. Although the authors point it out that without this knowledge no one could become a successful logistics manager, still it is clear that in the course of training the development of soft skills is indispensable. McKinnon et al. (2017) exceed the general manager approach. In their research they divide the employee groups into four categories (operative, administrative, shift or group leaders, and logistics managers), in order to be able to analyse the expectations of skills and training separately.

Lutz and Birou (2013) supports the closer cooperation of industry and education, in order to have more effective courses. Instead of theoretical education, they urge the use of more case studies, so that educational institutions develop relevant skills for the market.
According to Hoek's 2001 research, the later presented moderation method also helps the market and professional relevance of the courses, furthermore increases the students' research abilities.
The abilities, competencies include the knowledge; attitudes and skills the same way (Losonci et al., 2018). According to Sauber et al. (2008) competency is the manifestation of the result of the learning process, which can be the recognition of something, the possession of some knowledge, or the ability or skill that makes a person able to carry out certain activities. At the same time according to another approach, within the system of competencies we distinguish personal, cognitive, social and special competencies (Nagy, 2000).

Competency expectations in the sub-systems of logistics
„The logistics system is the system of material flows and stocks, as well as the information and management-structure related to them" (Chikán, 2017. p.393).
The three main phases/fields of the logistics process, which separately can be interpreted as customer service cycle, are procurement (when the purchaser is the customer), manufacturing supply (the manufacturing is the customer) and the distribution/sales (when the external customer is the customer). (Chikán, 2017; Demeter et al., 2009).

The breaking point between each cycle, when the material does not flow - that is stock accumulates – we mark on figure 1. as warehousing. In the following, we go through the competency expectations towards the sub-systems' employees.
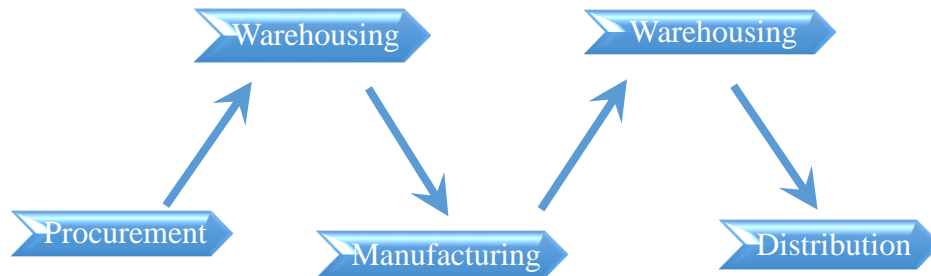

Figure 1. Main fields of logistics (own redaction)

In connection with figure 1. we note that reverse flow logistics plays an important role in the logistics system, but on one hand the activities carried out concur with the other fields of logistics, on the other hand the analysed sources do not deal with it separately either (Chikán, 2017 only wrote a separate paragraph about it).

Before we go into details, we have to see that a company or employee working on any field of logistics does the work well if he/she/it creates value for the customer. Companies determine their expectations towards their employees in a way that they should be able to fulfil the criteria independently, even without control. There are many logistics positions where it is impossible to have direct management control (driver, customer service, goods take out, etc.). Even in case there is no direct impact, the employee has to do a trustworthy and professionally impeccable job, therefore the selection is extremely important.

On the other hand, actual performance is affected by countless factors, attitude, abilities, skills, expertise, work experience etc. For a company the value of the employee consists of the perceived work performance, the position occupied within the company hierarchy and the existence or lack of certain elements. The research of Myers et al. (2004) deals with its discovery. With questioning managers of 157 companies till middle manager level, they examined the performance of logistics experts. They determined that on lower levels – till middle level – education and earlier work experience on the field of logistics had no effect on work performance, at the same time expertise, skills and abilities had a great influence.

They listed the most important abilities in 4 categories: problem solving, social skills, decision-making and time management abilities. The ability of decision-making includes

analytic thinking, creativity. Social skills, abilities display interpersonal relations, stress tolerance, leadership, team building, and communication. To decision-making abilities, they list self-confidence, self-assertion, open to new knowledge, ability of fast analysing, intuition, objectivity. It is interesting that they list to time management skills not only the ability to meeting deadlines, but also the ability to prioritization. Although, numerous further literature deals with the classification of abilities, skills (eg. Ballér et al., 2003.: general and specific abilities, or Juhász, 2004.: hard and soft skills), hereinafter we take the grouping of Myers as basis, and we will examine the discussed competencies in the framework set up by them.

Turning back to the determined competencies in the fields of logistics, already in the 1990's the Council of Logistics Management (CLM) did perceive the importance of employees, who have the appropriate skills and abilities in the field of logistics, and because of this, together with Mississippi University, they started an extensive research. Their aim was the exploration of jobs, tasks of the jobs, and the required competencies, the expectations towards education. The results were published in 1999 (Keller, 1999). Although in the research conducted by CLM, the expected knowledge appeared much more than the competencies acquired during the training, we only deal with the competencies here.

To describe the typical expectations of Hungary, we take as base the only research existing, which was made in 2006 by Pató Gáborné Szűcs Beáta as a doctoral dissertation, called „Competences, tasks in logistics systems".

In the course of her work, with the help of document analysis technique, she determined seventy-one competencies based on six hundred-twelve job descriptions. In addition to this, we shall not forget about the hidden competencies expected as evidence, which did not appear in the job descriptions, but is expectation towards the applicants. Later – in a very similar way –, the research of Karcsics Éva (2012) was born regards to the competency expectations of managers, in which the earlier by Myers (2004) et al. outlined results – according to which, education and earlier work experience in logistics field had no effect on work performance, but expertise, skills and abilities influence it greatly - were overturned in the Hungarian work environment. According to the research of Karcsics, 34% of job advertisements for managers applying to the field of logistics state professional experience as an expectation.

However, the earlier mentioned Derwik et al. (2016) in their research arrived to the conclusion that managers in the course of their work use rather „business general" and „behavioural" competencies, than the experience acquired in the fields of logistics and

supply chain, and depending on how they combine these, they reach synergistic effects. Therefore, the level of competencies used in practice goes beyond the sum of individual competencies.

In the following, we present in details the expected competencies of the logistics fields based on international (Keller, 1999; Gibson et al., 1998) and national (Patóné, 2006) researches.

For an easier overview, we summed up the logistics-specific competencies explored by these two researches in table 1. and 2. The annex 1-2 includes the most often appearing general competencies.

Table 1. Expected specific competencies in certain areas of supply chains based on Keller (1999), (CLM)

Expected competencies in Procurement	Expected competencies in Warehousing	Expected competencies in Manufacturing	Expected competencies in Distribution	Expected comprehensive competencies in the logistics field within the company
use of communication techniques	*Warehouse inspector:*	decision-making ability	ability to control	*Logistics manager:*
use of conflict and stress management techniques	ability to train people	ability to control	developmental ability	ability to build, maintain and develop a logistics organization
ability to conduct meetings	ability to control (ability to assess performance)	developmental ability	effective decision-making ability	selecting, developing, motivating and controlling the right people
	communication skills	time management ability	time management ability	team-building ability
	ability to motivate	excellent communication skills	selection and recruitment ability	communication, presentation skills
	stress management	ability to motivate	communication skills	decision-making methods and techniques
	time management ability		ability to teach others	*Supply Chain Manager:*
	user-level management of technical devices		leadership skills	comprehensive vision
	organisational skills			stress, and conflict management
	Warehouse manager in addition to these			project management skills
	decision-making ability			communication, presentation skills

	presentation skills			organisational skills
				effective decision-making ability

Source: own compilation

Table 2. Expected specific competencies in certain areas of supply chains based on Patóné (2006)

Expected competencies in purchasing	Expected competencies in warehousing	Expected competencies in the field of transport and material handling	Competencies related to comprehensive logistics within the company
comprehensive vision	endurance, adaptability	emotional stamina	information management, organizational awareness
team-building ability	well-groomed, good-looking, reviewing ability	technical sense	initiative skills
ability to control	extroversion, attention		creativity
responsibility	conflict management		logical thinking
expressiveness	consistency		confident attitude
risk-taking skill	directness		quality awareness
complex mindset	solvency, methodicality		being motivated
negotiation skill	systematism		work organization ability
company-level mindset	professional aptitude		independent work
customer orientation	courtesy		flexibility

Source: own compilation

When comparing the procurement columns of table 1. and 2. (Patóné, 2006 and Keller, 1999) we can make two findings: 1) Patóné determines in much more details the competency list regards to procurement, 2) there are numerous common elements in the two lists: such as use of communication techniques and expressive skills, conducting meetings and negotiation skills. Only the international study (Keller, 1999, Gibson et al., 1998) deals with the competencies needed in the field of manufacturing.

In Hungary, the most „formulated" competencies are collected in the field of warehousing. It is interesting that skills/abilities appear here such as courtesy, extroversion, consistency, systematism, of which the reader may rightly ask whether they really belong to the competencies. In the international research, they assigned the tasks to the jobs, then the necessary competencies. Management-level jobs in the field of warehousing are warehouse inspector and warehouse manager. According to Patóné's research, interestingly, there are only two specific competency requirements to the fields of transportation and material handling, obviously along countless generally expected competencies. (see Annex 2).

Managers dealing with the comprehensive logistics within the company have to have extensive information, expertise, knowledge, experience, practice and countless other competencies in order to be successful and effective, since they have to have a comprehensive picture about the so far mentioned sub-systems and their correlation.

The CLM research (table 2.) identified two senior management jobs – *logistics senior executive, supply chain manager* – with their job descriptions and expected competencies. In summary, we can say that in Patóné's research there are five competencies that appeared in each field and twelve further that are present at least in three sub-systems. Their summary can be found in Annex 1. By comparison, in the CLM research there is only one competency that appears in each field, the communication skill. At the same time, there are numerous competencies that are present at least in two sub-systems, which we summed up in Annex 2.

We gathered from the two researches the competencies appearing in several sub-systems and we classified them based on the four main competencies determined by Myers (2004). This classification can be seen in Table 3.

Table 3. Grouping of competencies from the aspect of Myers (2004)

Research		Group of abilities	problem solving	social	decision-making	time management
Patóné's (2006) competencies: 5+12	1	*teamwork*		x		
	2	*collaboration skills*		x		
	3	*ability of contact handling*		x		
	4	***communication skills***		x		
	5	***organisational skills***	x	x	x	x
	6	diplomatic skills		x		
	7	**decision-making ability**			x	
	8	analytical skills	x		x	
	9	result-oriented	x			
	10	**ability to think in processes/systems**	x		x	
	11	networking skills		x		
	12	**accuracy**				x
	13	precision	x			
	14	**problem solving ability**	x		x	
	15	**stress tolerance**	x	x	x	
	16	tolerance		x		x
	17	manager/leadership skills	x	x	x	x
Keller's (1999) competencies	1	**communication skills**		(x)		
	2	ability to control	x	x	x	x
	3	**effective decision making ability**			(x)	
	4	motivation	x	x		
	5	developmental ability	x		x	
	6	**time management**				(x)
	7	presentation skills		x	x	x
	8	**ability to handle stress and conflicts**	(x)	(x)	(x)	
	9	**organisational skills**	(x)	(x)	(x)	x
	10	ability to select and recruit	x	x	x	x
	11	ability to train and educate		x		
		Total	12	15	11	8

Source: own compilation

In table 2., in the rank of Patóné's competencies the first five are expected in all fields (italics), the competencies in bold appeared not only in the Hungarian but also in Keller's research (if not by word, but in content), which we wanted to illustrate in this form.

We can see in table 2. that a logistics competency can be connected to more general competencies. Although it is conceivable that not everyone would pair the competencies like this, based on the present pairing, social competency seems to be the most important and time management the least important competency group.

Examining the expected competencies, two important findings can be made: 1) the competencies explored in earlier researches in the field of logistics are mostly expected in any other field and can be considered general. This finding is also important because our results can be used not only in logistics trainings, but anywhere. 2) the majority of the explored competencies can be learned and developed, which is important from the aspect of education, since that is the focus of this article.

In the following chapter, we turn to the education-based approach and gather the possibilities that exist in the repository of the cooperative educational methodology to develop competencies.

Methods for developing competencies

Based on the above presented researches, we can state that such competencies are expected of the work force working in the field of logistics, which development is much more effective with cooperative methods, than the traditional educational methods most used and known to people. The cooperative is „only" one of the methods, along with the individual and the competitive methods. Of the latter, the essence of the competitive method – known and traditional to all - is that the lesson is based on frontal methods, the teacher is in central role, for whose attention and praise the students „compete".

The individual learning is the most well-known form of differentiated education, where students process the assigned tasks independently, and in case it is needed, they get „personalized" help from the teacher. Since they process the material at the pace that suits them most, the acquired knowledge can be said to be certain.

Obviously, each method has its advantages and disadvantages, knowing which, the teacher uses and combines them in order to reach the goal. In this article, we focus on cooperative methods. In the following, with an overview table (table 4.) we present the

main characteristics of some known cooperative methods, and the competencies they can develop. (Cserné, 2006)

Table 4. Competency-developing methods and competencies (own redaction)

Methods	Developed competencies
1/Field trip (Behrendt-Franklin, 2014): The teacher and students leave the school for a longer or shorter period, in order to get to know the real world and have new experiences. Its aim is to provide real knowledge, the development of attitudes and gaining of experiences, which are not available within the walls of the school.	experience, complex approach, knowledge acquisition
2/ Applications supporting online learning (kahoot, learning apps, mentimeter): In a playful way it helps to deepen theoretical knowledge with the help of XXI. century tools.	fast decision-making, complex mindset, problem solving ability, following the rules
3/ Situational game (Kazainé, 2015): The method applied to put theoretical knowledge into practice; to revive it or to close and summarize a topic.	communication and negotiation skills, analysing and problem solving ability, complex vision, complex mindset, self-knowledge, evaluation of roles and situations, decision-making ability, argumentation
4/ Short videos: An illustrative method helping the understanding and mastering of the knowledge acquired in theory.	complex vision, practical approach
5/ Teamwork: The starting point is the learning goal. By solving a task together, it helps to process the given topic, create a synthesis, formulate generalizations, expand knowledge and problem solving and develop collaboration skills.	social collaboration, creativity, problem solving in team, constructive learning
6/ Project method (M. Nádasi, 2003): Solving a concrete task or problem, with a great deal of freedom from the choice of goals till the evaluation of the results. The projects are generally worded by students/student groups individually, based on a specific life situation or a problem that is to be solved.	problem solving ability, creative thinking, collaboration skills, handling of comprehensive information, planning and decision-making ability, self-evaluation
7/ Conversation for educational purposes: "Exploration of a topic together, initiation of the comprehension processes in the participants of the conversation. This method enables the participants to ask questions, to raise their own problems." (Dinnyés et al., 2001)	active learning
8/ Training method: Its basis is the guided practice, preferably to the extent that the participant becomes able to perform at skill level. (Adult education and training lexicon, 2002).	self-development based on self-knowledge, criticism and self-criticism, ability to influence others, effective communication
9/ Debate: In the course of the debate, opinions and positions collide; the participants convince each other of their own truth with arguments or emotions.	activity, logical and complex thinking, correct argumentation, tolerance, critical attitude, self-image, self-knowledge
10/ Moderation method: The participants acquire knowledge and solve the problem through an independent learning process. For a successful implementation it is important to have a well-prepared moderator – not an expert on given topic -, who performs a supportive function with bringing ideas to the surface and asking the right questions.	collaboration skills, creativity, evaluation, systems approach, the verbal and visual representation of thoughts

11/ Case study method: Processing a situation taken from reality –based on publication, literature or own experience – in written form, with the help of earlier knowledge and experience.	active thinking, creativity
12/ Guest presenter (Horváth, 2015): Participates (may participate) in the writing and proofreading of university educational material. Undertakes (might undertake) supervisory and review tasks related to the dissertation.	vision, expansion of practical experience, networking skills, communication skills
13/ Individual presentation, based on prior preparation	presentation skills, independent thinking, time management, vision
14/ Group presentation, based on prior preparation	social collaboration, creativity, problem solving in group, constructive learning, presentation skills, time management, empathy, vision
15/ Group homework	social collaboration, creativity, problem solving in group, constructive learning, presentation skills, time management, empathy, vision

Source: Cserné (2006), own redaction

Table 5. Educational methods for the development of procurement competencies

Expected competencies in procurement	**Methods**
ability to control	debate, moderation method, situational game
responsibility	project method, training method, debate, moderation method
expressiveness	situational game, training method, moderation method, presentation, guest presenter
risk taking ability	case study method, training method
complex mindset	online applications, situational game, short videos, project method
negotiation skill	situational game, training method, guest presenter
company level mindset	situational game, short videos, project method
customer orientation	Group presentation, group homework

source: own redaction

We can see from table 4. that several methods can be used to develop a competency. When choosing and using the methods, the teacher decides which method is suitable for him/her, which can also be combined for effectiveness.

Among others, Spencer and Miguel Kagan (2010) have already developed countless aids, suggestions and techniques for the development, to help teachers' work to achieve goals. The methodology of cooperative learning is important, acknowledged and adapted in Hungary too, and can be used – according to the needs and skills of the teacher – in any schools. To apply it, there is no need for big investments, re-organization of structures or the creation of special systems.

To introduce it, even a single enthusiastic, determined teacher is enough, whose goal is to prepare students to real life in better mood, stress free lessons as effectively as possible and with the acquisition of more knowledge; leaving out the disadvantages of today's competitive and frontal method. The method of cooperative learning includes the implementation of cooperation. If the group in order to reach the goal cannot work together, then the task becomes unsolvable. Its importance gets an even bigger role in employment, since nowadays there are very little jobs, where you do not have to collaborate in order to achieve the company goals. Therefore, the use of cooperative methods has significant importance, not only because of the employers, but also because for the expectations of the „X", „Y" and moreover the „Z" generation the frontal method is no longer satisfactory (Tari, 2010, 2011).

Goals and results can be best achieved by combining the available tools (school and students both). So in logistics trainings the educational methodology can be shaped in a way that both the employers and the employees are satisfied. What is left is „only" to set up possible ways and frameworks for the development of desired competencies and their adaptation to the training output criteria.

The levels of education

Logistics education has several levels in Hungary. The lowest level is OKJ training. According to profession and exam requirements, in the course of OKJ's -54 841 11 logistics and shipping clerk training, students acquire the ability to solve the following tasks: planning and handling of logistics activities, the support of the logistics manager, and in connection with the shipping activity, the choice of the most suitable shipping method, and route planning as needed. The logistics and shipping clerk maintains contact with various transport authorities and organizations. He/she prepares the draft of the shipping contract and reduces risk with a freight-insurance offer appropriate to commercial transaction. His/her task is to ensure the information flow to the various carriers and participates in the investigation of the damage of various means of transport and goods, handles damage cases and checks and issues the various shipping documents, etc.

Although as a specialization, in some universities, for instance in BGE, logistics appears on a basic level, but as an independent major (from 2018 as supply chain management) it is only available on master's level. According to felvi.hu „The aim of the training is to train supply chain managers, who are capable of managing the corporate logistics system and the supply chain covering a range of companies by understanding the contexts of

integrated corporate logistics management. Possessing the necessary theoretical knowledge, and the awareness of modern practical solutions, they are capable to plan, analyse, develop and effectively manage logistics processes within and between companies. They are prepared to continue their studies in doctoral training."

It can be seen that while an OKJ certificate mainly equips the future employee with administrative skills, the master's degree promises an expert with economic expertise, insight into complex processes and with decision-making ability. These different levels do not appear in the analysis of Patóné (2006), but they do in the survey of Keller (1999), when he specifies further guidelines for managers within each field in addition to the basic competencies of the given field. (see table 1.).

Aim and scope of the research

Therefore, based on the different goals, we can assume that the training goals can be achieved by different educational methods. Since more of the cooperative methods aims at the development of decision-making, systems thinking, planning and managing skills, it is likely that they are more in line with the goals of the master's degree than with the OKJ level. That being so, we formulated two hypotheses:

H1: Master's degree students know the cooperative methods more, than OKJ students.

H2: Master's degree students find the cooperative methods more useful, than OKJ students.

Such a research – where the usage of educational methods are examined at two different levels and from the aspects of the students – is not found in the literature. The fact that the earlier presented researches summarizing the labour market expectations were conducted in 1999 and in 2006, requires the update of the data regardless of the specific nature of the study.

In Hungary there are numerous and growing opportunities for those interested in logistics studies both in middle and in upper levels, since nowadays „such kind" of training can be found almost in all significant technical or economic higher education institutions.

The postgraduate students participating in the research attend the supply chain manager master's degree course in Budapest Corvinus University, in three different groups. They typically applied to the logistics master's degree after finishing the basic course. Their choice was also influenced by the fact that already while doing their bachelor's degree, the vast majority of them had the possibility to get to know the basics of logistics approach within the subject Business Economics. Then in the third grade – as a foundation subject –for many, the subject Activity management appears, which, as an introductory course,

discusses the basic activities of logistics and manufacturing management, as well as the methods of structured problem solving in a process approach.

The students participating in secondary education (OKJ) were full time and evening students of logistics clerks (one group), and logistics and freight clerks (four groups) of two vocational high schools in Budapest. Since there is no other input criteria other than graduation, it is also possible to attend logistics courses in other secondary education institutions or in the organization of educational companies (OKJ).

Research methodology

The survey was conducted using an online questionnaire in October 2017. The method of data gathering was the same in each group. A link to the questionnaire appeared on a platform visible for all members of the groups – Moodle, Facebook – with a short message about the aim of the research -, and by clicking on it (either by phone or computer) students could complete the questionnaire consisting of 14 closed question groups, which mostly could be answered by marking on a Likert scale. Participation was voluntary, 86 students participated in the completion and the willingness of answering was 53,8%.

Results

Distribution of the responding students by level of education: OKJ: 35%, master's degree: 65%. Distribution of the responders by sex: 72% woman és 28% man. 90% of the responding students were between the age of 18-26 and only the 10% above 30.

Knowledge of each method according to the survey

Before asking the opinion of the students of each method, it was important to explore their familiarity. The question in the questionnaire was the following: „Which cooperative educational method do you know? You can mark more answers!" The possible answers were given by the cooperative methods presented earlier.

Table 6. Students' knowledge of cooperative methods

Ssz.	Methods	OKJ %	Master's %	Total %	Number of notations	Significance
1	Teamwork	90,3	96,4	94,2	81	p(v)=0,254
2	Field trip*	71,0	96,4	87,2	75	p(v)=0,001
3	Applications supporting online learning (kahoot, learning apps, mentimeter…)*	58,1	82,1	74,4	64	p(χ)=0,015
4	Case study*	38,7	91,1	72,1	62	p(χ)=0,000
5	Guest presenter*	45,2	85,7	72,1	62	p(χ)=0,000
6	Situational games*	38,7	85,7	69,8	60	p(χ)=0,000
7	Short videos	61,3	75,0	69,8	60	p(χ)=0,181
8	Project method	58,1	60,7	59,3	51	p(χ)=0,809
9	Conversation for educational purposes	54,8	46,4	50,0	43	p(χ)=0,452
10	Debate	38,7	55,4	48,8	42	p(χ)=0,137
11	Training method	29,0	37,5	34,9	30	p(χ)=0,426
12	The moderation method	9,7	14,3	12,8	11	p(v)=0,528

(p(v): probability quotient; p(χ):chi square; *:p<0,05)

Source: own research

Since in the course of the comparison of OKJ and master's there were several cells where the sample size did not reach five (for instance only two students knew the field trip), instead of the chi-square test we used the possibility quotient recommended for cases like these (Falus et al., 2008). Based on the results, among master's students the field trip, online applications, case study, guest presenter and situational games – supported also in a statistically significant way – are better known, in all the other methods there are no significant differences. Examining the two target groups together, we can say that the most known methods are teamwork and field trip. The least known ones are training and moderation methods.

Development capacities of each method according to the survey

The participants - after considering their familiarity with each educational method – had to think about how much these methods help in the development of the expected competencies in the supply chain. The range of „expected competencies" were known by the students based on the previous questions of the questionnaire, such as negation skills, collaboration skills, systems approach, teamwork, communication skills, networking skills, presentation skills, organisational skills, management/leadership skills, independent decision-making, business awareness, customer orientation, conflict management, stress management, ability to follow the rules, controlling and evaluating skills, consistency.

The question in the questionnaire was the following: „According to you, to what extent the listed educational methods help in developing the expected competencies in the fields of the supply chain (procurement, manufacturing, warehousing, distribution)? (1: strongly disagree 5: strongly agree)".

Table 7. The assessment of each educational method according to their developmental abilities

The assessment of each method's utility on average	OKJ	Master's	Average	Mann-Whitney U test
Teamwork*	4,37	3,89	**4,06**	0,035
Project method	4,10	3,95	**4,01**	0,619
Individual presentation, based on prior preparation	4,07	3,89	**3,95**	0,308
Situational game	4,00	3,84	**3,89**	0,630
Field trip	3,96	3,80	**3,85**	0,472
Debate	4,08	3,67	**3,82**	0,106
Conversation with educational purposes ***	4,20	3,46	**3,78**	0,006
Group presentation, based on prior preparation	3,90	3,61	**3,71**	0,202
Case study	3,87	3,64	**3,71**	0,423
Guest presenter**	4,00	3,47	**3,65**	0,019
Group homework	3,48	3,41	**3,44**	0,656
Short videos***	3,86	3,15	**3,40**	0,001
Online applications (kahoot, learning apps, mentimeter..)***	3,92	2,96	**3,28**	0,000
Moderation method	3,31	3,19	**3,25**	0,793

Source: own research

When comparing OKJ and master's we used for the statistical test, the Mann-Whithney U test generally applied to compare the average of two samples (Falus et al., 2008).

Based on the statistical test we found differences in teamwork, conversation, guest presenter, short videos and online applications. Rather strange that in each case of difference, OKJ students found the given tool more useful.

Among the methods, teamwork, project method and individual presentation appeared to be the most effective ones. It is a surprising result that online applications (e.g.: kahoot) performed relatively poorly, especially in master's degree. Group homework and short videos did not get a too positive assessment either.

Evaluation of the results

The biggest difference between the participants of secondary and higher education in the familiarity of each method is in the case study, guest presenter and situational game.

The former and the latter can be clearly explained by the different levels of training, since these methods help students in decision-making and solving complex problems.

The difference experienced in the field of guest presenter may result from the fact that university students are already presented with lifelike and leadership problems.

The difference in the familiarity of online methods may stem from a difference in educational technique and the preparation level of the lecturer. These results confirm the differences articulated by the two different levels of education, students of OKJ training probably know certain methods less, because those are not used in their training. Due to its name, the moderation method can sound unfamiliar to many, the method probably does not have such special characteristics that students can recognize. It might be worth it to present this method in a slightly more explicit way, to make it recognizable. In any case, it would be worthwhile to address this matter further.

In the light of the results, the H1 hypothesis set up for the familiarity of the methods can be accepted. Although we did not identify any tools which the OKJ students know better, than the students of master's degree, but we found several that the latter group considered better known. This is consistent with Keller's (1999) research, in which for example the warehouse manager (see figure 2.) has further abilities beyond the skill set of warehouse workers.

Turning to H2 hypothesis, the obtained results are much harder to interpret. It is visible that OKJ students – though not significantly everywhere – but considered all the methods listed more effective, than the master's degree students, even those that they did not know. This result can be explained with the fact that people with lower abilities are less critical. But ad absurdum it is also conceivable that the effectiveness of master's degree education can be explained with the lack of lecturer preparedness.

After all, while in secondary education, teachers must have a teaching qualification; for lecturers in higher education they must have a high-level education in their own subject, that is the criteria of their employment. Though there are higher education institutions – mostly abroad –, where lecturers pay attention to educational methodology training – for instance they have to do an obligatory training before they can teach – this is absolutely not typical in Hungarian higher education. Nor is it characteristic of BCE, where the master's students – who participated in our research – attend. Although there are efforts for the Pedagogical Institution to provide voluntary assistance to lecturers, for lack of time few uses this possibility.

In any case, based on the results, H2 hypothesis must be rejected, as students not only did not find the evaluated educational methods more useful, they considered some of the methods specifically less useful. The most surprising result appeared in online methods. Since this educational method will most certainly have an increasing weight in the future,

we decided to ask of some students a detailed written opinion about the reasons of negative assessment. These opinions can be read in table 8. below.

Table 8. Students' opinion about the reasons of negative assessment (own research)

Master's degree	OKJ
I think that only the evaluation part of the online method is useful, it is less usable for knowledge transfer. For e-learning tests in many cases the book can also be used, which is basically not a problem, but most of the time we do not even read the material. If the book is available in digital form, then with „ctrl+F" function we search the keywords, read the context and give the right answer. This way we see the text only once, which I believe is not enough. I have the same opinion about Kahoot. It is funny, useful and enjoyable for repetition or tests, but not suitable for knowledge transfer. There is not enough time to process the question, nor the answers, because you have to race with time. In 4-5 minutes, we cover at least 10 topics; there is no time for the heard/read information to settle.	Students' IT interest and knowledge also matters. Not everyone likes today's mechanized world. This score depends a lot on the age of the students, where they live (city, village). This area can be strengthened, at my company there are more trainings already through e-learning, in pps, video or written form, and at the end there is a test, which can be repeated several times. But it is not the same at us either, how old someone is and how fast with the computer.. etc. In my opinion, another generation is still needed for the widespread use of online teaching, e-learning.
It is a fact that many times something does not work and it does not really come into the teacher's attention. For example, I updated my kahoot page once. Then you need a new username to enter back in. There was also a time that my phone froze, and also that one of the classmates started complaining, leaving the whole group behind on a task.	I really liked using Kahoot. Actually, it was tiring, because you had to think fast and the music stressed me out. That I hated. I think everyone likes these games, that is why it got a good result.
I think that the low score (I can only evaluate this category's low score regarding Kahoot because in my studies I never met another online application for learning) may result from the fact that the game is generally obligatory in class and it specially requires activity. I can imagine that not all students prefer this way. Furthermore, all students achieve a ranking, which does not depend only on correct answer but also on speed. Perhaps, someone would know the correct answer if they had more time to think it through and did not have to consider speed.	Useful, entertaining and helps fast and short learning. It also nurtures the spirit of competition, especially when there are small rewards.
Considering the example of Kahoot, in numerous occasions students are unexpectedly „invited" to play. If you can count on it and you know in advance the topic, then this method could be a perfect alternative for quick tests, provided there is enough time given to answer the questions. Namely, at this possibility it needs to be taken into account that students have different technical equipment (faster/slower smartphone, tablet, laptop, wifi connection/mobile data), so in some class rooms where the university wifi signal is weaker, those who do not have enough mobile data or a good coverage have a disadvantage.	

Based on the opinion of the students, the way in which online teaching methods are used and the available technology are the factors that primarily influence the overall picture of this method.

Conclusions

In the article, we explored the connection of the competencies developed in training and expected in practice, to which as a new approach we used the opinion of students. We

questioned students participating in secondary and higher education (OKJ and MSc) about their familiarity and the effectiveness of the introduced cooperative methods. The importance of the topic is justified by the change of the economy and within the logistics sector, the changes in the characteristics of students entering higher education (Takács et al., 2017), and the need to explore the employers and students' – potential employees' – opinion about the expected competencies. The added value of our work is that it explores the opinion of logistics students about their familiarity and the usefulness of the applied educational cooperative methods in two different levels – OKJ and Master's. The expected competencies were examined so far only from the aspect of the employers, and the two educational levels were not distinguished from each other.

Examining the necessary competencies explored from literature, we arrived to the conclusion that most of them can be developed in training, therefore it is very important that the expected competencies as well as the methods helping their development are well known among the teachers/lecturers. Hence, in this study, we shortly present those cooperative educational methods that serve the acquisition of these required competencies. During the pairing of methods and competencies, it was found that successful „cooperation" can be achieved by carefully planning the specific goal (competency to be developed) and the way to achieve it (cooperative method).

In addition to the expected ones, numerous competencies that can be developed appear in the methodological table, which enables flexibility to the teachers/lecturers, and allows them to meet any new requirements that may arise. We would like to emphasize that the presented cooperative methods are not only useful in logistics training, since the majority of logistics competencies can be considered as general competencies. Based on the hypothesis testing, it got confirmed that master's degree students know more cooperative methods (H1), which may give hope that this wide range of methodologies equip students with the skills required by the market. From the testing of the hypothesis, it can also be seen that there are numerous methods, which are useful in OKJ and master's level to the same extent. This result also indicates that the cooperative methods and the competencies developed by them are not only required in university education but also on lower levels. The testing of the H2 hypothesis shed light on the fact that the effectiveness of the broad methodological repertoire for masters' students still needs to be refined.

Since we could only guess the reasons of the relatively bad evaluation, we asked some students to verify the results. Their opinion confirmed the assumption that the problem is rather with the possibilities and the way of application, not necessarily with the methodology itself. Definitely, one of the basic suggestions of our article is to put more

emphasis on the matters of educational methodology in secondary and higher educational institutions.

Mainly because today's students have very different expectations – most of all immediately useable knowledge – and all in a fun, eye-catching way. The professional knowledge of the educators are not enough here (it helps a successful business to a relatively small extent, see Derwik et al., 2016, 2017), it is becoming more and more important to pay attention to the development of students' soft skills in the meantime.

Our research has two important limitations. One of them is that we do not deal with bachelor's degree logistics training. Involving this level would also help in exploring the difference – or the lack of it – between bachelor's and master's degree. Thereby, we could easier answer the question, why it is worth for a student to spend two more years in university after finishing the bachelor's degree. And of course that would make it also clearer on the corporate side why it is worth to let a young employee to attend master's degree or to enlist them to that level, furthermore give a higher salary for those coming from that level of education. Further limitation and also research possibility is the update of the database of the competencies expected by employers, taking into account the individual levels of education nationally and internationally, as well as the level of positions held (McKinnon, 2017).

This would be highly actual, as much time has passed since the surveys of 2006 and 1999, spiced up with huge technological and social changes. As a result of constant economic changes, the known competencies no longer fulfil the given tasks.

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3.2. Paper2. Analysis of educational methods developing expected competencies in the logistics field by factor analysis

Abstract

In today's world of digitalization and Internet information facts get outdated quickly. Especially in logistics, where this phenomenon makes it difficult for employees to perform their duties day by day, therefore those educational methods that are used to develop competencies and skills required to cope with this challenge become extraordinarily important.

I used quantitative research through online questionnaires to learn the opinion of students participating at different levels of logistics education (adult training courses and MSc) about their awareness and perceived effectiveness of the different educational methods that focus on developing such competencies. Testing my hypotheses on the students' assessment of the given educational methods, the factor analysis resulted in such enlightening conclusions as the consistency of the opinion of the two student groups on a few components.

Keywords: logistics, supply chain, competencies, educational methods, factor analysis

Introduction

Companies in order to achieve and maintain success and competitiveness determine specific properties, requirements in a relation to a potential employee. (Karcsics, 2011; 2012)

These requirements are not limited individually to knowledge, attitudes or skills, but to competencies that sum up all three (Losonci et al., 2018). The goal of the present study is to highlight the interrelationships between the cooperative teaching methods used in logistics trainings and the opinion of the students in relation with their effectiveness in the development of competencies, which make it possible to train students and employees more effectively in the fields of logistics.

For now, there are only rather international researches (Keller, 1999; Gibson et al., 1998; Kotzab et al., 2018; Gudanowska et al., 2018; Thai et al., 2011; Derwik et al., 2016, 2017; Flöthmann & Hoberg, 2017; Hoberg et al., 2014; Myers et al., 2004) regarding the

competency requirements of the employers, according to which the outstandingly important properties are: systems approach, accuracy, precision, flexibility, collaboration, the ability to follow the rules, organisational skills, managing/leadership skills, stress tolerance, work load capacity.

In Hungary the research of Patóné (2006) presents the competencies expected from employees working in the fields of procurement, manufacturing, distribution and comprehensive logistics within the company. Its results are largely in line with the international researches.

Competencies that are expected and have to be developed

The starting point of my research is two analyses, which appear as „basic" researches on the topic and examine the competencies expected by employers linked to procurement, warehousing, distribution and comprehensive logistics within the company.

In the following, I present my research and its results based on the most important findings. Patóné's (2006) research examined job advertisements in the fields of logistics with the help of the document analysis technique, in course of which she gathered from websites 71 expected competencies, of which more than half were specific to only one field, and only five that appeared in all job descriptions. These are as follows: **communication skills, organisational skills, networking, collaboration skills and teamwork.** In contrast, Keller (1999) in his research that was conducted together with Mississippi University, defined only communication skills as a competency expected in all fields.

After writing down the five „key competencies", Patóné (2006) defined those twelve that appeared as expectation of the potential employers at least in three fields.

Diplomatic skills, decision-making ability, analytic skills, results orientation, systems thinking, networking ability, accuracy, precision, problem solving ability, stress tolerance, work load capacity and managing/leadership skills are all fully in line with the results of international researches, as are the five key competencies. Therefore, in the questionnaire used in our research, we focused on those educational methods that serve the development of these competencies.

Munkácsi-Demeter (2019) gives a detailed overview of the area-specific elements of the national (Patóné, 2006) and international (Keller, 1999) competency researches. When comparing the two tables we can see that several identical competencies appear as expectation. Such as communication, effective decision-making, time management, stress and conflict management, and organisation. Thinking through these factors, it can

be determined that in „logistics" trainings besides teaching the adequate knowledge of the literature, there has to be emphasis on developing the competencies with the cooperation of students and lecturers. This is the only way to meet the requirements of the labour market and the students' subconscious expectations. I classify as subconscious expectation the demand - already consciously expressed after acquiring the diploma - to find a well-paying workplace, in line with one's ideas, which can only be achieved if above mentioned conditions are met.

Cooperative educational methods used for development purposes

According to the researches of Keller (1999) and Patóné (2006) we can establish that professionals wanting to work in any fields of logistics have to have such competencies that are much more effective to develop with the use of cooperative methods, than the most often used traditional (frontal) educational method known for most of the people. Here we have to mention the Kagan-Kagan couple as founders and disseminators of the cooperative method, who elaborated countless aids, suggestions and techniques already from the eighties, in order to help educators achieve their goals.

With their help for instance, countless examples of teamwork unfold before us, with which almost all the competencies examined by us – communication skills, organisational skills, networking skills, collaboration skills, teamwork, decision-making ability, analytic skills, result orientation,systems, networking ability, accuracy, precision, problem-solving, stress-tolerance, load capacity, managing/leadership ability – can be developed, if applied in the right time, place, with the right purpose, preparedness of the educator, feedback, student cooperation and motivation.

In the following, we overview the cooperative educational methods that are subject of the study and used at the different levels of logistics training, according to the role and task of the lecturers, and the conditions of given method's application – supplementing the characteristics described by Munkácsi-Demeter (2019).

These supplements are important because the methodological preparedness of the lecturers and the familiarity of the conditions needed for the application of given method influence greatly the efficiency of each method, and therefore they serve as useful knowledge.

It also suggests that it is important to spend time and energy on the methodological preparation and advanced studies of the university professors.

Table 1. Educational methods and their most important characteristics

Methods	Role/task of the professor/teacher/andragogue	Condition(s) of the application
1/ Field trip	prepares; organises; takes care of the trip, the accommodation, escort; determines the goals; considers the connection of education and the trip; source of information; makes connection between the experience and the prior knowledge; later revives; incorporates the experience into education	students' prior knowledge; information for the students about the circumstances of the trip; receptivity; information for the host about the expectations, the level of the students, the needs of the group
2/ Online applications	prepares the platform, determines the goals, gives feedback to theory	motivation, following the rules, internet, prepared online platform, tools
3/ Situational game	determines the goals and assigns the roles accordingly, carefully prepares the roles, coordinates, summarizes, sheds light on the relationship between theory and practice, feedback	motivation, courage, acting skills, undertaking spirit, collaboration skills, empathy, appropriate environment and occasion
4/ Short videos	determines the goals and the tools needed to achieve them, carefully prepares the appropriate video	openness, cooperation of teacher and students, technique
5/ Team work	has an important role in creating the groups, supports, coordinates, gives feedback	each member of the group has to be motivated and cooperative
6/ Project method	only controls covertly, helps, supports, less knowledge transfer	educator-student cooperation, independent activity of the student or students
7/Conversation with educational purposes	competent, brings well-structured opening questions, with the right management style, summarizes the lessons learned, systemises key findings	participators know each other, bringing up own problems, activity, interest, cooperation
8/ Training method	has big expertise, qualified leader, with psychological preparedness, with empathy, with discretion, handles the processes of group-dynamics	determinability of the behaviour (goals) to be learned, desirable behaviour, determinability of the level of acquisition of the desired behaviour
9/ Debate	bringing up the matter, the structuring of the debate, encouraging compliance with the rules of the debate, furthering of the debate with appropriate questions, summarizing the results	the existence of intention to participate and an opinion
10/ Moderation method	the moderator (not source of knowledge) „brings to the surface, helps to organize and express knowledge and needs" (Nissen–Iden, 1999)	material conditions: badges, cardboards, felt-tip pens, adhesive for fixing, chairs in a semi-circular way ensuring open communication
11/ Case study method	prepares, creates the conditions, observes, gives feedback, evaluates	active participation, team spirit, motivated and cooperative members
12/ Guest presenter	prepares, organises, creates connection between theory and practice, coordinates, gives feedback	contact between the university and future, technical tools
13/ Individual presentation	determines goals and aspects, prepares and creates the conditions, gives feedback, evaluates	motivation, cooperation between educator and student, technical tool

14/ Group presentation	determines goals and aspects, prepares and creates the conditions, gives feedback, evaluates	motivation, cooperation between educator and student, technical tool
15/ Group homework	determines goals and aspects, gives feedback, evaluates	motivation, cooperation between educator and student, and student and student

Source: Cserné, 2006; (own reduction)

Research

The goal of the research is getting to know the opinion of students participating in higher education in the fields of logistics (OKJ and MSc) on the awareness and usefulness of cooperative methods experienced in training from the aspect of competencies expected by employers.

The online questionnaire was conducted in October 2017 with a group of logistics administrators, four groups of logistics and shipping administrators of the Budapest Economic Vocational Training Center, and with three MSc supply management groups of Budapest Corvinus University. The conduct method of the survey was the same in each group.

A link to the questionnaire appeared on a platform visible for all members of the groups (Moodle, Facebook) - with a short message about the aim of the research -, and by clicking on it (using any electronic device with internet access) it was available and could be filled out.

The questionnaire was created with the help of Qualtrics online questionnaire editor program, which helped the processing and evaluation to a large extent. The participation was voluntary. The resulted database consisted of 86 students: 35% was OKJ (30 people), 65% were MSc students (56 people). The 10 % of the responders were above 30 years old, which meant the participants of the OKJ training who were working in logistics at the time of the survey. The 18 to 20 age group was given by participants in full-time OKJ training after graduation (17,44%). In the 21-23 age group both OKJ and MSc students were already present (18,6%). In the 24-26 age category more MSc students appeared, but also OKJ students already in employment (53,49%). The responders were mostly women (72%).

Awareness of cooperative methods

In order to be able to assess the students' opinion about the methods, it was important to get an idea about their familiarity regards to them first. Therefore, the question appearing in the questionnaire was as follows: „Which cooperative educational method do you know

the best? You can mark more!" The possible answers were the earlier introduced cooperative methods.

It can be said about the familiarity of the 86 responders, that the most well-known methods are group work with 81 votes, field trip and company visit with 75, online application with 64, case study method and guest presenter both with 62 votes. Following these, closely come situational game (60), short videos (60), project method (51), and conversation with educational purposes (43), debate (42) and training method (30). The least well known is the moderation method with 11 votes.

The awareness was also examined by educational level, which results are available in the article of Munkácsi-Demeter (2019). After this, I asked the students about the developmental effectiveness of each method.

The assessment of effectiveness of cooperative methods

For the question: „According to you to what extent the listed educational methods help in the development of expected competencies in the fields of the supply chain (procurement, manufacturing, warehousing, distribution)?" the students' answers can be summed up as follows.

In the case of each method, the question had to be answered on a Likert scale from 1 to 5 (1: strongly disagree; 5: strongly agree), which was supplemented by the answers „I don't know the method" and „I cannot judge". From the listed 15 cooperative methods, teamwork reached outstanding results, because more than 39% of the responders rated its effectiveness with a 5, and more than 33% with a 4. If at each methods we go through the answers „strongly agree" with its efficiency, then individual presentation, field trip, situational games and debate come after each other behind teamwork with a few percent difference from each other. Interesting result that students marked among the unknown methods moderation method (50%), training method (more than 30%) and the conversation and project method (15-15%), which all are favourably used by companies (Hoek, 2001). At the option „I cannot judge its efficiency" moderation method appeared with close to 13%, training method with more than 10% and debate with 9,3%. These results greatly influence also the results of the factor analysis. In summary, we can determine that students found teamwork and presentation the most effective methods for developing competencies.

Factor analysis

In order to see which methods are considered by students to be of similar effectiveness and nature, and to be able to give a more comprehensive assessment of the characteristics of cooperative methods, I examined whether the methods could be grouped. I did this with the help of principal component analysis and based on the feedback of students, I was looking for answers to the following questions: on what basis do the methods get into a certain group, can they be interchanged, can they replace each other or do they support/complete each other. The hypothesis testing came thereafter.

The examination of the 15 variables examining cooperative techniques was made with the help of Principal Component Analysis, with the SPSS (25) software package (Bartlett<0,05, explained variance 78%, KMO=0,462).

Although the Bartlett test is adequate (below 0,05 it can be considered as such), the value of the KMO was unacceptable (the closer it gets to 1 the better, limit: 0,6), it was necessary to rethink the analysis.

Table 2. Principal Component Analysis

Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	**4.797**	34.261	34.261	4.797	34.261	34.261
2	**2.047**	14.624	48.886	2.047	14.624	48.886
3	**1.478**	10.557	59.443	1.478	10.557	59.443
4	**1.362**	9.729	69.172	1.362	9.729	69.172
5	**1.194**	8.530	77.702	1.194	8.530	**77.702**
6	.908	6.486	84.187			
7	.761	5.433	89.620			
8	.440	3.144	92.764			
9	.362	2.585	95.349			
10	.195	1.395	96.744			
11	.178	1.274	98.018			
12	.144	1.029	99.047			
13	.097	.691	99.738			
14	.037	.262	100.000			

Source: own research

Since the training method and the moderation were the least known, therefore I ran the analysis again by removing them individually. Although it would have been more appropriate to leave out the moderation method, due to its lower familiarity, but with that, the KMO test would still not have been acceptable, the data loss would have been 30%, and the distribution of the method groups was not really favourable either. Therefore I decided to leave out the training method (Bartlett=0,000, KMO=0,611).

Based on the communality test **the variables are suitable for creating principal component analysis** with them. The result of the principal component analysis is presented on table 2., and the component matrix on table 3.

Table 3. Component matrix omitting the training method

| Methods | Components | | | | |
	1: Comprehensive within company.. CA:0,753	2: Presentation.. CA:0,735	3: Creativity.. CA:0,154	4: Awareness	5: Mind broadening
Teamwork	**.828**			-.352	
Situational game	**.699**		.390		
Short videos	**.678**	-.314		-.343	
Project method	**.629**			-.543	
Debate	**.615**		-.495		
Conversation with educational purposes	**.601**	-.415			.331
Online – study supporting – applications	**.570**	-.459	.413		
Group homework	**.548**	.395	-.347	.361	
Individual presentation, based on prior preparation	.633	**.735**			
Team presentation, based on prior preparation	.674	**.677**			
Case study method	.383		**.569**		
Moderation method	.390		**-.454**	.418	
Field trip	.472		.304	**.618**	
Guest presenter					**.848**

Source: own research

The factors appear in order of importance according to their role in explaining the entire system of correlations, that is, the first is the most important. The factor weights indicate how the given factor correlates with the original variables, that is, the role/weight of given original variable in the formation of the factor and at the same time in its meaning. The higher the positive valued factor weight, the greater role the given variable has in the formation of the factor (Falus, Ollé 2008).

1/ Those methods belong to the first component, which help develop **the competencies expected for the comprehensive logistics within the company**. Reviewing the methods presented in table 1., we can determine that exactly those competence-developing methods got into the first component, which are the criteria of the comprehensive logistics within the company (see: Munkácsi-Demeter, 2019): **handling information, being initiative, creativity, work-organizing skills, logical thinking, confident attitude, quality awareness, motivation, independent work, flexibility and organisational awareness**. Based on the result (0,753) of Cronbach's Alpha (in the following: CA), each method develops the same skill.

2/ Methods developing **presentation skill** belong to the second component, the individual and the group form too. (value of CA also suitable here: 0,735).

3/ The elements of the third component are case study and moderation method. From the table it is clearly visible that they got into the same group with opposite signs (-/+), which shows the opposite correlation between the factor and the variable. The result of CA indicates the same: 0,154. So in principle, they would not be aggregable because they measure a different phenomenon, but nevertheless both methods have in common that they belong to the method group that develops **creativity**, therefore I continued to handle them as the same group.

4/ The fourth component is field trip, which is a method developing **awareness**.

5/ The fifth component is the method of guest presenter, which serves to **broaden** students' **minds**.

In summary, we can say that the correlations between the individual methods have been successfully explored with the created groups, and that the methods belonging to the individual components can be interchanged and treated as each other's' supporters/complements. Knowing these results, all the conditions were given to perform the hypothesis test.

Hypothesis test

The goal of the hypothesis test was to compare the assessment of effectiveness of the methods classified in each component between the OKJ and masters' groups. This matter is interesting, because the two levels of education train workers with different employment-levels, who – based on the training output criteria and the international researches (Keller, 1999; Meyers et al., 2004) – need different competencies. However, naturally, the assessment of the students does not necessarily coincide with the companies' expectations, but probably there is a strong correlation between the two, already just because the vast majority of both the OKJ and the MSc students works alongside studying.

Therefore the examined hypothesis **H1** *(H3 in the "big" research plan)*: There is a difference between OKJ and MSc students in the assessment of the methods belonging into the principal components.

Table 4. Assessment of OKJ and MSc students about the elements of the principal component

All the responders (OKJ and MSc)	Average	Principal component	OKJ Mean Rank	MSc Mean Rank	Significance of the Mann-Whitney test
Online applications supporting studying (kahoot, learning apps, mentimeter..)	3,28	1	17,67	7,33	0,000
Situational game	3,89				
Short videos	3,40				
Team work	4,06				
Project method	4,01				
Conversation with educational purpose	3,78				
Debate	3,82				
Group homework	3,44				
Individual presentation, based on prior preparation	3,95	2	11,67	13,33	0,590
Group presentation, based on prior preparation	3,71				
Moderation method	3,25	3	12,00	13,00	0,755
Case study method	3,71				
Field trip	3,85	4	10,17	14,83	0,114
Guest presenter	3,65	5	13,75	11,25	0,410

Source: own research

The examined variables are given by the five created principal components and the levels of education (OKJ, MSc). Due to the type of variables (the five created principal components: scales and the variable measuring the training levels: OKJ and MSc, which is nominal data), the test chosen to examine the prerequisites was a nonparametric (Mann-Whitney U) test.

According to the assessment of masters' degree students, the methods belonging to the first principal component, that serves the development of competencies used in comprehensive logistics, are less suitable to develop these competencies, since the Mean Rank (average of scores) values were 17,67 at the OKJ students, and 7,33 at MSc.

Therefore, the H1 hypothesis got confirmed in case of the first principal component, which was also reinforced by the significance level of the Mann-Whitney test.

Furthermore, we can say that for the methods developing the presentation skills (second principal component), for the components serving creativity, awareness and mind-broadening (3., 4., and 5.), the Mean Rank values do not show significant differences, therefore in these cases the H1 hypothesis did not get justified.

In summary, the H1 hypothesis, according to which „There is a difference between OKJ and MSc students in the assessment of the methods belonging into the principal components" was only partly justified in connection with the first principal component

that serves the development of the competencies necessary for the comprehensive logistics within the company.

Knowing this, we can declare that the methods of online applications, situational game, short videos, teamwork, project method, conversation with educational purposes, debate and team homework are found by OKJ students more efficient from the aspect of the development of competencies that are important for employers.

Summary

All in all, we can say that with the help of factor analysis, the 15 cooperative educational methods - developing the expected competencies presented in the examination - were divided into 5 components by the student opinions, in which only the first has a differentiated assessment of the effectiveness of the methods. Interestingly, the methods (first component) developing **the competencies in connection with the comprehensive logistics within the company** were evaluated less effective by Msc students, although the methods most useful for the development of the competencies necessary for them, such as *online applications, situational games, short videos, teamwork, project method, conversation with educational purposes, debate and team homework* are listed here. It shows the importance of the results that the best way to train an expert that meets the market's expectations is to know his/her expectations, opinion; and that he/she is properly motivated, active and satisfied during the training (van Hoek, 2001). If his/her ideas do not match the applied practice, in a particular case he/she does not find the educational methods sufficiently effective, then there are obstacles to reaching the goals, which will affect the stakeholders of the process (student, educator, educational institute, potential employer), and their effectiveness.

Therefore, a great emphasis should be placed on the use of appropriate methods and their combinations, on MSc level as well as during company trainings, for which the present result may also help.

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3.3.   Paper 3. Competencies required for the implementation of an efficient supply chain from the perspectives of students and the labour market

Abstract

The supply chain, the system granting customer satisfaction, is an important field in our changing world. This field's profit-oriented companies seek employees with the competencies to achieve their goals. Our research's aim was to raise awareness of those competencies that should be developed. We questioned 110 supply chain management (SCM) master's degree (MSc) students from Corvinus University of Budapest (CUB) and performed a significance test on their answers. They were asked to assess 17 competency groups and state the extent to which – on a scale from 0 to 100 – supply chain managers need them. One of the most interesting results was the assessment of presentation skills, which indicated differences between the competencies that companies expected and those that students believed were required. This study not only lays the groundwork for further research but also emphasizes the relevance of those competencies to be developed and the rethinking of training outcome requirements.

Keywords: supply chain management, logistics, master's degree (MSc), competency, labour market

Introduction

Statistics show that, in 2020, there were labour shortages in countless fields and sectors (KSH, 2020a), which supply chain managers (transport and warehousing) also have to face. In the third quarter of 2020, in the transport and warehousing sector, there were 3740 vacancies (rate of vacancies: 1.7%) (KSH, 2020b), which suggests that the most restricting factor for efficiency is not the unemployment rate but the lack of human resources, for which there are numerous potential reasons (Munkácsi, 2019). In a supply chain (transport and warehousing), one of the possible reasons could be the difference

between the competencies expected and those developed in the educational system, which indicates a lack of necessary competencies of graduating 'professionals'. Therefore, besides professional knowledge, emphasis should be placed on the development of the abilities and skills that potential employees need to succeed. Most of these are so-called soft skills, for example a complex and critical mindset and advanced communication and collaboration skills (Mihalkovné Szakács, 2014). These are abilities that still cannot be replaced by machines and that, with sufficient care, can be well developed during training.

Our research was based on previously specified competency criteria (e.g. the system approach, decision-making ability, and stress tolerance) determined by national (Patóné, 2006) and international (Derwik & Hellström, 2017; Derwik, Hellström, & Karlsson, 2016; Flöthmann & Hoberg, 2017; Gibson, Gibson, & Rutner, 1998; Keller, 1999; Myers, Griffith, Daugherty, & Lusch, 2004; Thai, Cahoon, & Tran, 2011; Van Hoek, 2001; Murphy, & Poist, 1991) research on some outstanding tasks in the supply chain, with the aim of helping companies to achieve and maintain competitiveness and success. The goal of the present research was to define and compare the – possible – differences between the competencies required and those that the students believed to be required in the supply chain. Therefore, we assessed students' awareness of the expected competencies, as a result of which we can assist in defining the realistic expectations of the labour market. We consider this to be essential because, according to our experience, if students have realistic ideas and expectations concerning their specialization, they can identify more easily with the goals of the training (the training of marketable employees). If the goals and the methods applied to achieve these goals are known, students will be willing to invest more energy and will be more cooperative and more likely to follow the rules during training. These attributes are among the required competencies, and making students recall and apply them can be helpful for their work. Furthermore, they will understand the importance of the applied methods, which might increase their satisfaction. They will be more content with the training and their own performance as members of the workforce, which will most likely also increase the satisfaction of their employers. Thus, our research results can be important for newly graduated students aiming to work in the supply chain, for professors in training, and for potential employers since the expectations defined by the students might influence the processes of training and employment too.

We identify the market expectations using the results of the above-mentioned international research and the European Skills, Competences, Qualifications, and

Occupations (ESCO) specifications. ESCO is an important tool supporting the Europe 2020 strategy and the new European skills development project. ESCO's classification determines and categorizes the skills, competencies, qualifications, and professions related to the EU labour market, education, and training. This classification system was developed by the European Commission's Directorate-General for Employment, Social Affairs, and Inclusion with the cooperation of stakeholders and the European Centre for the Development of Vocational Training (Cedefop) (ESCO, 2020a,b). The DeSeCo project – to be mentioned later – is also connected to this. Although, according to our assumptions, which are described later in our hypotheses, students have a realistic picture of the competencies required in each field, most of the time – except for trainees in dual education – they meet the labour market's expectations only after obtaining their degree. Thus, the present research's purpose is to help with students' preparation by developing training that satisfies the real expectations. In the implementation, we relied on our preceding research results (a student survey) and the results of international research.

There were discrepancies between the competencies developed in training and those expected in the workplace (KSH, 2020b) even before starting the research, which also supports our previous view that, besides transmitting knowledge, education, and training, institutions have to emphasize the development of the required competencies based on assessing and continuously following the market demands, which also require flexibility on the part of the institutions. According to Lutz and Birou (2013), for an institution to enter the market with useful training and successful professionals, closer cooperation between industry and education is essential.

Henceforth, to ensure accordance between stakeholders, after defining the concept of 'competency', we discuss the expectations of the supply chain's sub-systems based on the previously mentioned research (Derwik & Hellström, 2017; Derwik et al., 2016; ESCO, 2020; Flöthmann & Hoberg, 2017; Gibson et al., 1998; Keller, 1999; Myers et al., 2004; Thai et al., 2011). Then, we introduce the methodology and results of the research. We examine the students' answers first by field and then by analysing them and comparing them with each other to ascertain whether there is a significant difference between the competency expectations in each field and whether there is a difference between the competencies expected by employers and those believed to be expected by students. We close with conclusions and suggestions.

Literature review

In this section, we provide an overview of, define, and then frame the most important term that we examine and use: competency. This is essential because this concept's boundaries are blurred or mixed with other expressions (ability, skill, attitude, and knowledge), which might create barriers to interpretation. We sought to eliminate this possibility by clarifying the meaning of the concepts.

Ability and skill

We will see later that, in clarifying the concept of competency, the concepts of ability and skill will be decisive. Ability and skill are often used as synonyms, despite the fact that several definitions seek to clarify the difference. To show the distinction, we present short descriptions. 'If the activity does not require the direct use of consciousness, we perform the activity basically automatically, we talk about skill, but when solving a complex task we need the combination of a wide range of knowledge and skills, we talk about ability' (Falus, 2010, p. 7). Furthermore, Falus et al. (2009) highlighted that 'skill' mostly appears as an ability, despite the fact that it contains three well-separated psychic formations in Hungarian (p. 9):

1. practical skills for the automatic execution of simple operations,

2. skills for partially automated execution of more complex operations, and

3. the ability to perform a more comprehensive activity, the ability.

The DeSeCo (Definition and Selection of Competencies) project – launched by the OECD in 1997 – also drew attention to the content difference between 'competence' and 'skill': 'in the DeSeCo project, the terms "*competence*" and "*skill*" *are not* used as *synonyms*. ... Skill is used to designate an ability to perform motor and/or cognitive acts' (DeSeCo, 2004, p. 321). The DeSeCo project is embedded into the OECD's long-term Education Indicators Project (INES), which aims to provide measures for the functioning, development, and impact of education and to complement international empirical studies, such as the Programme for International Student Assessment (PISA) (DeSeCo, 2004). ESCO's description of skills is 'The ability to apply knowledge and use know-how to complete tasks and solve problems. Skills are described as cognitive (involving the use of logical, intuitive and creative thinking) or practical (involving manual dexterity and the use of methods, materials, tools and instruments)' (ESCO, 2019, p. 19). It is also important to mention the interpretation of 'skill' of Employment and Social Development

Canada (ESDC) (n.d.): 'Developed capacities that an individual must have to be effective in a job, role, function, task, or duty' (ESDC: Adapted from the U.S. O*Net definition of skills). Skills are, for instance, communication skills and the ability to walk, talk, swim, drive a car, read, write, and so on. In the following, we clarify the concept of competency.

Competency

Regarding the concept of competency, we used the definition applied by ESCO and the European Qualification Framework for Lifelong Learning (EQF), in which competence is defined as 'The proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations, and in professional and personal development' (ESCO, 2019, p. 19), which suggests that a person facing new situations and unexpected challenges can use his knowledge and skills in a self-directed manner (ESCO, 2020). To accept or reject this approach, we prepared some tables with a summary of the relevant definitions of competency from the international literature. To form a final position, we tried to find out as widely as possible and to present here the definitions that can be normative for education, for performing well in the world of work, and for the training of future generations. Among the concepts are the definitions by Boyatzis (1982, 2008) and Spencer and Spencer (1993), which are the most cited definitions in the field of *management*, both accepted and applied by organizations supporting competency-based *education* (EQF and Cedefop) and the spread of *employment* (ESCO, EU, DeSeCo, and ESDC).

Table 1. Definitions of competency presented by authors

Source:	Competency
ESCO, (EQF) (2020, p.19)	„Competence: The proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations, and in professional and personal development"
Council of the EU (2018, p.7)	"one's ability to combine Knowledge, Skills and Attitude [KSA's] to show expected behaviour when performing a professional task"
Cedefop (European centre for the development of Vocational Training) (2014, p. 47-48)	"competence ability to apply learning outcomes adequately in a defined context (education, work, personal or professional development) or ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development. Competence is not limited to cognitive elements (involving the use of theory, concepts or tacit knowledge); it also encompasses functional aspects (including technical skills) as well as interpersonal attributes (e.g. social or organisational skills) and ethical values. "
Male et al. (2011, p. 154)	Competency: „actions, assumed to be manifestations of knowledge, skills, attitudes and dispositions
DeSeCo (2004. p.321)	„competence designates a complex action system encompassing knowledge, cognitive skills, attitudes and other non-cognitive components" "Each competence corresponds to a combination of interrelated cognitive and practical skills, knowledge and personal qualities such as motivation, values and ethics, attitudes and

	emotions. These components are mobilised together for effective action in a particular context."
Boyatzis (1982, p. 23, 2008, p. 6)	1982, p.23: „A threshold competency is a person's generic knowledge, motive, trait, self-image, social role, or skill which is essential to performing a job, but is not causally related to superior job performance." 2008 p.6.: „competency is defined as a capability or ability"
Patóné, (2006) in Pató Gáborné Szűcs Beáta et al. (2021)	'The set of an individual's characteristics that - through the performance of work tasks - contributes to the achievment of organizational goals.'
Baartman & De Bruijn, (2011, p. 126)	competency: "consisting of integrated pieces of knowledge, skills and attitudes", and it is assumed to be essential for appropriate functioning on the job
ESDC (2020) (Employment and Social Development Canada)	"Competencies: The combined utilization of personal abilities and attributes, skills and knowledge to effectively perform a job, role, function, task, or duty." Source: Adapted from the International Society for Performance Improvement, and the **Organization for Economic Co-operation and Development**
Sauber et al. (2008, p.375)	„A competency is a statement of learning outcomes based on awareness, a body of knowledge, or a skill. When students exhibit a competency, they demonstrate a specific knowledge or an ability to do certain things. That demonstration illustrates the outcomes of a learning process."
Athey and Orth (1999, p. 216)	„competency is . . . a set of observable performance dimensions, including individual knowledge, skills, attitudes, and behaviors, as well as collective team, process, and organizational capabilities, that are linked to high performance, and provide the organization with sustainable competitive advantage. „competency is a set of observable performance dimensions, including individual knowledge, skills, attitudes, and behaviors, as well as collective team, process, and organizational capabilities, that are linked to high performance, and provide the organization with sustainable competitive advantage".
Spencer és Spencer (1993, p.4)	competencies: „motives, traits, self-concepts, attitudes or values, content knowledge, or cognitive or behavioral skills – any individual characteristic that can be measured or counted reliably and that can be shown to differentiate significantly between superior and average performers, or between effective and ineffective performers".

Source: Own compilation

Male, Bush, and Chapman (2001) examined the general competencies expected of Australian engineers, the normative concept being that of Cedefop (2014). Baartman and De Bruijn (2011), in their research, focused on complex work tasks. Sauber et al. (2008) reported on the competency model developed in the field of supply chain management. Athey and Orth (1999) examined the future competency methods. To obtain an overview of these approaches, explore the existing parallels, and help choose the acceptable normative concept more easily, we prepared Table 2. It shows the presence or absence of the elements (knowledge; skills, abilities, and attributes; attitude and others – KSA) that appear most often in the definition of competencies, broken down by the authors and organizations that are important for our research.

Table 2. Appearance of competency elements by authors

Authors/ competency items	knowledge	skills, abilities, and attributes	attitude	others
ESCO/ EQF (2020)	x	x		social and/or methodological abilities
Council of the European Union (2018)	x	x	x	
Cedefop (2014)	x	x	x	functional aspects, interpersonal attributes, ethical values
Male et al. (2011)	x	x	x	dispositions
DeSeCo (2004)	x	x	x	non-cognitive components
Boyatzis (1982, 2008)	x	x		motive, trait, self-image, social role, capability
Baartman and De Bruijn (2011)	x	x	x	
ESDC (2020)	x	x		
Sauber et al. (2008)	x	x		awareness
Athey and Orth (1999)	x	x	x	behaviours, collective team, process, organizational capabilities
Spencer and Spencer (1993)	x	x	x	motives, traits, self-concepts, values, any individual characteristic

Source: Own compilation

When examining the content elements of the competencies, the presence of the concepts of cognitive knowledge, knowledge, and ability can be observed in all classes. The 'attitude' line contains an 'x' only if it has been displayed in the definition by the authors themselves. In our research, we have often experienced a situation in which, although the term attitude itself did not appear in the definition, its content elements, for example behaviour, conduct, habit, or action, did. In our case, ESCO, Boyatzis, Sauber et al., and the ESDC are among these authors. Thus, it can be said that the theoretical background presented supports our commitment to the approach applied by ESCO and the Council of the European Union (2018). Henceforth, we adopt the following definition of competency:

Competency: The proven ability to use knowledge, skills, and personal, social, and/or methodological abilities in work or study situations and in professional and personal development. It is one's ability to combine knowledge, skills, and attitude (KSA) to show the expected behaviour when performing a professional task.

In the following, we present a review from the employer and student perspectives and then compare results with the expected competencies of the supply chain. We determined the employers' expectations based on research found in the literature (Derwik et al., 2016; ESCO, 2020; Flöthmann & Hoberg, 2017; Hoberg, Alicke, Flöthmann, & Lundin, 2014; Keller, 1999; Munkácsi & Demeter, 2019; Patóné, 2006; Thai et al., 2011), while the students' assessments were based on our own research.

Expected competencies in the supply chain fields

In the last three decades, there has been a continuous transformation in almost all fields of the supply chain, which has greatly influenced the expectations of and competency criteria for employees. According to Thai et al. (2011), nowadays, a successful logistics manager must have not only expertise but also business, logistics, and management skills.

This is supported by the research by Derwik and Hellström (2017) and Derwik et al. (2016), which explored managers' competencies in the logistics and supply chain field. As their final conclusion, they identified five major competency groups. Below, in the parentheses, the contents of each competence group and then the extent of their use during the daily activities and decision making of managers can be seen:

6. business managerial competence (dynamic awareness, business and stakeholder management) (observations 30–40%);

7. generic competence (communication and cognitive abilities) (20–30%);

8. behavioural competence (intrapersonal and interpersonal) (15–30%);

9. functional competence (technology and administrative routines) (5–20%);

10. supply chain management expertise (supply chain management areas of expertise and applied analyses) (0–5%).

Their results are consistent with our previous statement that, in education today, the development of soft skills is indispensable. Although professional knowledge is important in managers' everyday practice, without these skills and abilities, no one is capable of becoming a successful logistics manager. Flöthmann and Hoberg (2017) identified further abilities for complex daily tasks, such as a complex perspective and mindset, proficiency in different business fields, such as strategic decision making, communication, and management, intercultural skills, and analytic and informatic skills. According to Hoberg et al. (2014), those who work as managers in any field of logistics nowadays can be called 'decathletes'. Kovács and Pató (2014) stated that the required

general competencies for transporters in supply chains are the following: make well-informed decisions swiftly, organize their own work and the work of others in an efficient way, communicate effectively with customers and other departments, coordinate work with the rest of the team and other departments, and act as an 'entrepreneur' when conceiving new business plans and networking outside the company. Pató, Kovács, and Pató (2006) listed the following necessary competencies: reliability, fairness, cultivated appearance, firmness, independence, communication skills, problem-solving ability, elaborateness, and result orientation.

Next we turn to the competency expectations for purchasing, production, warehousing, and distribution as the supply chain's fields or sub-systems. First, it is necessary to clarify the basic concepts in the fields and the tasks of the managers so that each reader understands the same contents of the given concepts. In our research, we defined the tasks following the ESCO definitions. The purchasing, production, warehousing, and distribution processes are parts of the so-called logistics system. 'It is the system of material flows and stocks, as well as the information and management structure connected to them' (Chikán, 2017). Purchasing, production supply, and distribution/sales are the three main phases/fields of the logistics process, which can be interpreted separately as the customer service cycle (Chikán, 2017; Demeter, Gelei, Jenei, & Nagy, 2009). The warehousing tasks come into focus when there is stock accumulation because something hinders (breaking point) the process of the flow. This can also happen between the sections of purchasing and production or between production and distribution. ESCO (2020a) provided precise definitions of managers' tasks in the fields, from which we summarize the competencies appearing in our research in Table 3.

Table 3. Task definitions and connection to our own research

Positions	ESCO definition by highlighting competencies	Competencies appearing in ESCO from our research
Logistics and distribution managers	"Logistics and distribution managers **take decisions** on logistic services, operations and provisions. They **take** internal and external variables **into consideration** for **effective and successful** organisational logistic services. They **give** appropriate **support** to all the activities of the supply chain from the beginning to the end. These professionals **organise** the storage and distribution of goods and **ensure** that the right products are delivered to the right location on time and at a good cost."	complex mindset-system approach, collaboration skill, communication skill, management ability, ability to organize, work in a team, decision-making ability, business approach, stress tolerance, ability to control and evaluate, consistency, ability to follow the rules

Purchasing managers	"Purchasing managers are in charge of **buying goods**, equipment and services for their company, and try to ensure the most competitive prices. They are also **responsible** for **negotiating contracts**, reviewing the quality of products and **analyzing** suppliers, and the use and resale of goods and services."	negotiation skills, complex mindset-system approach, communication skill, organizational skills, management ability, decision-making ability, business approach, customer focus, ability to follow the rules
Industrial production managers	"Industrial production managers **oversee** the operations and the resources needed in industrial plants and manufacturing sites for a smooth running of the operations. They **prepare** the production schedule by **combining the requirements of clients** with the resources of the production plant. They **organise** the journey of incoming raw materials or semi finished products in the plant until a final product is delivered by coordinating inventories, warehouses, distribution, and support activities.	complex mindset-system approach, collaboration skill, ability to organize, customer focus, decision-making ability, business approach, management ability, ability to control and evaluate, ability to follow the rules
Warehouse managers	"Warehouse managers assume the **responsibility for** storage facilities. They **manage the operations and the staff** within."	complex mindset-system approach, collaboration skill, communication skill, management ability, ability to organize, work in a team, decision-making ability, ability to control and evaluate, consistency, business approach, ability to follow the rules, presentation skills, customer focus
Distribution managers	"Distribution managers **plan** the distribution of goods to various points of sales."	complex mindset-system approach, collaboration skill, communication skill, management ability, ability to organize, work in a team, decision-making ability, business approach, ability to control and evaluate, consistency, ability to follow the rules

Source: ESCO (2020a); own compilation

ESCO provides numerous alternatives for naming a position, for which – when looking any of them up – the same content appears. In the case of logistics manager, the default setting on ESCO's website is logistics and distribution manager, but the alternatives include logistics manager, which we use. For each position, ESCO divides the expectations in the given field into four levels. These levels are always based on essential skills and competences, then the essential knowledge follows, later the optional skills and competences, and last the optional knowledge. In our research, we focused (Annex 4) on the levels of essential skills and competences and optional skills and competences, which we used to compare the previous national and international research and the competencies that we examined. Reviewing Annex 4, three findings can be made: 1) it explains the competencies that are specifically expected in more detail than any research before; 2) all of these can be classified into our examined categories; and 3) the same type of task can be found with different wordings. The fact that the ESCO competencies can be classified into our categories allowed us to treat the competencies of our research as category

groups. After defining the concepts and reviewing the important literature, we first present the methodology applied in our research and then the students' assessments of the competencies expected in the supply chain, which we also compare with the ESCO database.

Methodology, data collection, and data analysis

One of the aims of our research is to raise awareness among students participating in higher education (MSc) in the fields of supply chain management of the competencies that are required and that they should develop for successful employment by comparing students' opinion with national and international research results. It is likely that students – before applying to the supply chain management specialization – are familiar with the specifics and the criteria of employment and have a realistic picture of the expected competencies. Therefore, we set up two hypotheses:

H1 (H4 in the „big" research): Students know that the most important labour market expectations of a logistics manager are a systems approach and management ability, which stand out significantly even compared with the assessments of the other managerial positions.

H2 (H5 in the „big" research): Students know that the most important labour market expectations of a purchasing manager are negotiation and communication skills, which stand out significantly even compared with the evaluation of other managerial positions.

We note that, in our competency questionnaire, based on the research by Keller (1999) and Patóné (2006), the 23 competencies of the EU divided into three groups (managing, work, and key), defined in 2006, can also be identified (Annex 3). For the inquiry, we used an online questionnaire, which was shared twice with students at CUB-SCM (2017–2020). The method used for conducting the survey was the same in both cases. With the help of the groups' professors or people with responsibility, a link to the questionnaire appeared on a platform that was visible to all the members of the group – Facebook or Microsoft Teams – with a short message about the purpose of the research, and it could be filled in by using either a computer or a mobile phone. In total, 110 questionnaires could be evaluated. The questionnaire consisted of 14 questions, which included some data about the respondent (age – given on an interval scale, gender, nature of training, and name – as an optional parameter) and, the important elements of the research, questions to be answered on an adjustable scale between 0% and 100%, such as: 'According to your opinion, how essential are the listed competencies (17) for 1. a

logistics manager, 2. a purchasing manager, 3. a distribution manager, 4. an industrial production manager, and 5. a warehouse manager'.

The other questions referred to the development of the listed competencies and the respondents' methodological awareness and assessment of their usefulness, the results which can be found in a previous publication (Munkácsi & Demeter, 2019). The database established is presented in Table 4.

Table 4. Information about the database

| | % | Person | Gender | | Age | | |
			Female	Male	21–23	24–26	27–30
I. Data collection	49	54	40	14	10	44	0
II. Data collection	51	56	35	21	28	26	2
Sum	100	110	75 (67.6%)	35 (32.4%)	38 (34.6%)	70 (65.38%)	2 (0.02%)

Source: Own compilation.

Since there was no significant difference between the two samples, based on either age or gender distribution – which the chi-square test also proved – we handled the answers as one sample. In the following, we present the assessment of the expected competencies from a student perspective following two approaches. We first compare our results with national (Patóné, 2006) and international (ESCO, 2020; Keller, 1999) research by field (logistics, purchasing, production, warehousing, and distribution) and then by competency. Figure 1 and Table 6, which already contain the data side by side and ranked, serve to help monitor the results.

Labour market expectations by field

The first field is the 'logistics manager competencies', regarding which we can remark that, in the enclosed Tables 1 and 2, containing the specific expectations, the competencies of the logistics manager appear as 'expected comprehensive competencies in the logistics field within the company', because the research by Keller (1999) referred to two positions: logistics senior executive and supply chain manager. In Patóné's (2006) research, we started with the assumption – since no specific position was named – that the comprehensive competencies in the company's logistics field are the abilities and properties that a logistics manager has, along with other characteristics, for example knowledge, experience, and skills (see the definitions of competency presented earlier). Therefore, we handled this 'field' as the expected competencies of a logistics manager.

The following graph (Figure 1), aligned with the summary table, shows the student assessment for each manager by competency. Due to small deviations and the easier perception of outliers, the scale starts at 55% on the Y axis. To help ensure traceability, a concrete value was indicated for the outliers.

Figure 1. Differences in the assessment of managers' competencies
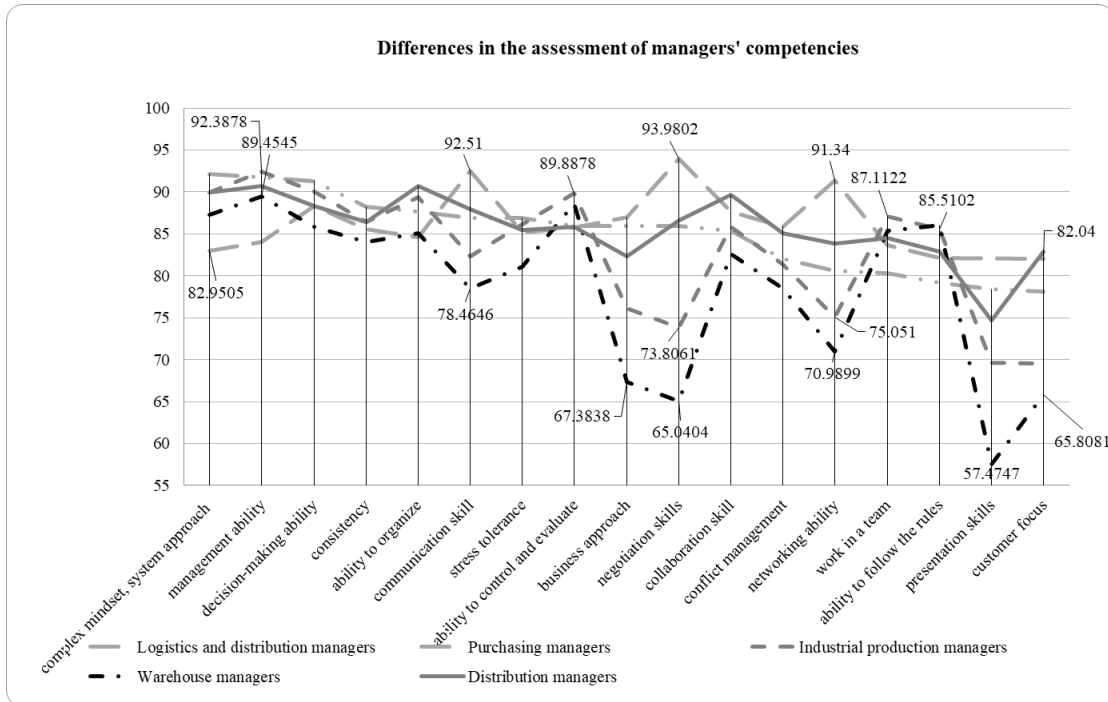
Source: Own research, own compilation

Expected competencies of a logistics manager

In this position, communication and presentation skills (Keller, 1999) are outstandingly important, of which presentation skills are the least important for students; only customer orientation received lower scores. This is very surprising because a manager must have not only appropriate communication skills but also presentation and lecturing skills to be able to achieve the goals. The next unexpected result is that the ability to follow rules, which is very important for a manager because of the need to set an example, has also been pushed into the background. The system approach also plays an important role for logistics managers as a specific competency – comprehensive vision – in Keller's research. Decision-making ability is also included among the most important competencies; according to Keller, it is a specific expectation – effective decision-making ability – and, in the research by Patóné, decision-making ability is a general expectation. Students ranked organizational skills among the top five competencies, identified as specific in both studies. For Keller, it relates to the supply chain manager position.

According to ESCO, logistics managers have much more specific (S=21) (expected in the given field) competencies besides the 'generic' (G=13) managerial qualities (Annex 4) than in previous research.

Expected competencies of a purchasing manager

Based on Keller's research (1999), a purchasing manager's specific competencies are the use of communication techniques, conflict management, and the ability to conduct meetings. In Patóné's (2006) research, there are significantly more expectations among the specific competencies, such as negotiation skills, a comprehensive vision, the ability to control, a complex mindset, customer orientation, and so on. According to our research results, the most important requirement for a purchasing manager is negotiation skills, which are a specific competency both in Keller's (1999) – ability to conduct meetings and use of communication techniques – and in Patóné's (2006) research, as well as customer orientation, which surprisingly occupies the last place. In the second place is communication skills, then networking, decision-making, and collaboration skills, which are among the generic expectations in Patóné's (2006) research. The ranking of these competencies – except for customer orientation – reflects students' good insights into the expectations of a purchasing manager. As for purchasing managers, it is surprising that communication skills do not appear as an expectation for ESCO, while, according to the students, it is the most important in this field. 'Handling customer relationships' and 'conducting meetings …' suggest the expectation of communication skills. Despite occupying the midfield in the research, conflict management, consistency, and stress tolerance are completely absent. Teamwork (ranked 13th) and collaboration skills (ranked fifth) are also missing from ESCO's list, which rather features the characteristics necessary for effective decision making and a systems approach. Field-specific competencies determine the composition of the list the most (with a ratio of 25/15).

Expected competencies of an industrial production manager

Patóné (2006) did not specify competencies in this field, but in Keller's (1999) research, among the specific competencies, there are controlling and developmental skills, time management, and motivational skills. Placing management skills in first place is a remarkable idea for the future managers of logistics, since it concurs with the field-specific expectations, in the same way as control, evaluation, decision-making ability, and systems approach. Customer orientation is the least expected attribute, which is a realistic view in the case of a production manager. For ESCO, in the case of production

managers, the system approach has an important role in the planning, organizing, managing, and controlling of production processes. These tasks are mostly included. Interestingly, there are elements among the optional expectations that can be found in the case of logistics, warehouse, or purchasing managers, for example analysing supply chain strategies or assessing supplier risk. Another interesting fact is that, after the basic competencies, the following were mentioned as optional: define manufacturing quality criteria (define quality standards), develop manufacturing policies (create manufacturing guidelines), and schedule production (adjust the production schedule), highlighting the importance of these specific tasks.

Expected competencies of a warehouse manager

Keller's (1999) research identified two positions: warehouse inspector and warehouse manager. The most conspicuous difference is that, while the students ranked presentation skills last, Keller (1999) considered them as a specific competency. The managing, controlling, and evaluating skills, the systems approach, and the ability to follow rules are listed amongst the most important expectations, which is consistent with both previous studies. Patóné (2006), for instance, marked reviewing ability and consistency as specific competencies, which are compatible with the systems approach and the ability to follow rules. Furthermore, in this field, the greatest difference can be observed between the most important (management skills: 89.45%) and the least important (presentation skills: 57.47%) elements.

It is interesting that the students found decision-making ability to be much more important – in line with earlier research – than customer orientation, which was the third least important element. We emphasize these two competencies because, in modern warehouses, everything is controlled by machines and software, for example the placement of goods, the order of removal, the schedule, and the need for human resources. Almost all processes are strictly regulated, and managers do not really have to make independent decisions. In turn, if a warehouse is not customer oriented and goods are late or damaged, outstandingly high costs can arise (e.g. compensation costs, loss of customers, and loss of future orders). The warehouse manager's competencies were the most extensively explained by ESCO of all the managers examined. From the expectations listed here, we found two – 'maintain updated professional knowledge' and 'have computer literacy' – that do not fit into our list of 17 competencies. For the categorization of the other characteristics from our groups, decision-making ability, conflict management, stress tolerance, and negotiation skills did not emerge as labour

market expectations for a warehouse manager. Most attributes could be categorized as 'ability to follow rules'. The additional 7-7-7 requirements could be arranged in the categories of management skills, system approach, and organizational skills, which, according to the students, are the most important for a warehouse manager. Our earlier statement that a warehouse manager no longer really needs independent decision-making ability but must have a customer-oriented approach seems to be proven here. In the case of ESCO, the costumer focus appears from various angles, for example performing services in a flexible manner, acting reliably, showing confidence, building business relationships, and improving business processes.

Expected competencies of a distribution manager

In this field, management skills are the most important competency according to both students and international research, along with organizational skills, according to the students to the same extent. It is interesting that, while Keller considered these to be a leadership skill, in Patóné's research, they are not even among the generally expected competencies. Next in the ranking, with a difference of no less than 1 percentage point, is the systems approach, which the national research listed among the generally expected competencies, as in the case of the purchasing and warehouse managers. Specific competencies in Hungary include technical sense and emotional stamina. Stress tolerance – strongly attached to the latter – was ranked among the moderately expected competencies by the students. As an interesting curiosity, we can point out that independent decision-making ability was only emphasized among the generally expected characteristics by the international research. In the national research (Patóné, 2006), it is the only field in which it did not appear.

The importance of communication skills is increasingly supported by the fact that both Keller's and Patóné's research listed it as a generally expected competency in all fields. The students, however, allocated it 'only' to the sixth place. According to our results, the selection and recruitment ability from Keller's research is best covered in terms of content by organizational skills (first–second place) and independent decision-making ability (fourth place), but other competencies may be useful in this position, for example the systems approach, the ability to control and evaluate, and even the business approach. In our opinion, in this field, the criterion for Keller's (1999) developmental and time management ability is mostly defined by the business approach, for which students are highly likely to have a different view as they ranked it in the penultimate place. Having

introduced the expectations in each field, we will now summarize the significant differences in the assessment of each manager competencies.

Labour market expectations by competencies

Table 5. helps in exploring the correlations, and, in our analysis, we considered the systems approach, the most expected competency in the logistics managers' field, as the baseline. The order of the competencies in the table was thus determined by the order of importance outlined against it. Furthermore – proceeding (by line) by competencies – we marked the highest value in each competency with grey, and the ones that show significant deviation with bold black. To perform the significance test, we applied the Wilcoxon test, in which the initial baseline was always the highest value (grey) of the given competency. The result indicates the manager(s) for which it shows a significant deviation in the assessment of the given competency. With the following table, we focus on analysing these significant differences.

Table 5. Significant differences in the assessment of managers' competencies

BLACK-normal	not significant deviation	p>0.05
BLACK-BOLD	significant deviation	p<0.05
GREY	highest value within a given competency	
(….)	e.g. in ESCO	(1-5): 5 most important competency

Managers/ expected competencies	Logistics and distribution managers	Purchasing managers	Industrial production managers	Warehouse managers	Distribution managers
complex mindset, system approach (develop…, plan.., analyse)	92.09	**82.95**	**(3) 89.9694**	**(3) 87.2828**	**(2) 89.899**
management skills	91.80	**84.02**	(1) 92.3878	**(1) 89.4545**	**(1) 90.7374**
independent decision-making ability	91.24	**(4) 88.28**	(2) 90.0204	**(5) 85.8182**	(4) 88.3636
consistency	88.26	**85.52**	86.44	**84.07**	86.39
organizational skills (manage staff)	87.61	**84.57**	(5) 89.4082	**85.06**	(1) 90.7374

stress tolerance (handle stressful situations, stress management)	86.88	**85.17**	86.17	**81.03**	85.44
communication skills	**86.88**	(2) 92.51	**82.36**	**78.46**	**(5) 87.9293**
ability to control (monitor) **and evaluate**	**85.95**	**85.77**	(4) 89.8878	(2) 88.6263	**85.88**
business approach (consider economic criteria in decision making)	85.92	86.99	**76.13**	**67.38**	82.28
negotiation skills	**85.89**	(1) 93.9802	**73.81**	**65.04**	**86.59**
collaboration skills (liaise with colleagues)	85.41	(5) 87.6139	85.87	**82.63**	(3) 89.6263
conflict management (liaise with colleagues)	**81.99**	85.85	**81.37**	**78.48**	85.07
networking skills	**80.55**	(3) 91.34	**75.05**	**70.99**	**83.80**
ability to work in a (logistics) **team**	**80.36**	**83.64**	87.11	85.36	84.48
ability to follow rules (comply)	**79.14**	**82.11**	85.51	(4) 86.0202	**82.90**
presentation skills	78.38	nd	**69.59**	**57.47**	74.67
customer orientation	78.12	82.04	**69.49**	**65.81**	82.86

Source: Own compilation

The initial baseline is the system approach – the most important attribute of logistics managers. We can see for this characteristic that – according to the students – there is no other manager field requiring complex vision and the ability to think in systems as much as logistics managers (92.08%); these are indispensable, since they have to unite all the other fields. The 2.12% lower value for production managers was already enough to determine a significant deviation. The significance values were .000 for the purchasing manager, .010 for the warehouse manager, .039 for the distribution manager, and .047 for the production manager. According to the students, the above competency is the least expected – with a 9.13% difference – of purchasing managers, which is clearly visible in Figure 1. Management skills were assessed as most important for the production and the logistics manager. Therefore, there is no significant difference between these two (sig.: .214). However, there is in the case of the three other managers (sig.: .000, .001, .011); furthermore, we see a decrease of more than 8% for the purchasing manager (sig.: .000). In the assessment of the independent decision-making ability, there is no significant

difference between the logistics (91.23%), the production (90.02%), and the distribution (88.36%) manager. In spite of a few hundredths of difference between distribution and purchasing managers (88.28%), we can see a deviation that is already significant. In the same way, this applies to warehouse managers (85.81%), for whom independent decision-making ability has already been a fundamental expectation in the earlier national and international research, but – as we mentioned previously – nowadays it is not really expected because of automation. Indeed, of all the managers, they are the ones who need this competency the least, so here the students were correct. It is interesting, however, that, despite of all this, it appears in the fifth place in the competencies of warehouse managers, so it is among the most important ones.

In the assessment of consistency, the same tendency appears for independent decision making (highest for the logistics manager (88.25%) and deriving the most significance for the purchasing and warehouse managers). The values change the least here; in total, there is a difference of 4.18% between the highest and the lowest (warehouse manager) value. Organizational skills appear with the highest value (90.73%) for the distribution manager, but the difference of more than 3% compared with the logistics manager is not significant. Hence, organizational skills have, as for the production manager in these three positions, the same importance. However, for the purchasing and warehouse managers, due to the different natures of their tasks, it counts as a less relevant ability, with 84.57–85.06%.

Communication skills are one of the four competencies (with *systems approach*, *negotiation skills*, and *networking skills*) for which, compared with the highest value (here for the purchasing manager: 92.51%), there is a significant distinction in the values in all the fields (for the logistics manager, sig.: .001; for the others: .000). The students considered it to be the least significant for the warehouse manager (more than 14.05% difference, 78.46%). This is very surprising, even compared with the results of the national and international research, in which communication skills appeared as a generally expected competency on the manager level. For stress tolerance, as well as for decision-making ability and consistency, the logistics manager is in the 'first' place (86.88%) and, compared with the purchasing and warehouse managers, shows a significant difference from the lowest value (81.03%). It is worth mentioning that, to arrive at this distinction, only a 1.71% difference (in the case of the purchasing manager) was enough.

Interestingly, the ability to control and evaluate appears to be the most expected (89.88%) for the production manager. This is also the competency, along with the ability to work in a team, that is thought to be similarly important for warehouse managers (distinction within 2%); therefore, it does not show a significant deviation. The ability to control and evaluate was found to have around 85.8% (+/- 0.1% difference) significance, which has already been indicated in the test. We can remark that the students, in the course of class or home teamwork, hardly gave any feedback about their fellow students' work. In our opinion, the reasons for this could be a deficiency of appropriate communication techniques or their inexperience with assertive communication. Hence, it is essential to pay special attention to the development of this field.

The biggest difference lies in the assessment of the business approach. We emphasize the acquisition and proper usage of this aspect as early as in the bachelor's degree, but even more so in the master's degree. As our main aim concerns the training of managers, we assume that students find it essential for every manager. However, the results show the contrary. Here, the distinction is almost 20%. While the value for the purchasing manager is 86.99%, for the warehouse manager it is 67.38%. Compared with the purchasing manager, the logistics and distribution managers show no significant difference, but the production and warehouse managers do. Negotiation skills appear with the biggest deviation (28.94%). The highest value, 93.98%, seen for the purchasing manager, is understandable and acceptable. The significant differences can be explained by the large deviation, which was proved for every manager during the test with significance of .000. The warehouse manager, with 65.04%, has the least need to possess this competency. Collaboration skills are an important criterion for each manager, since a good leader has this attribute. The students confirmed this with a 7% deviation; the interesting point is that they assigned the highest value to the distribution manager, and a significant difference could be seen only for the warehouse manager. There was only one interesting case – the distribution manager – in which conflict management did not show a significant difference from the purchasing manager (85.84%).

Between the most and the least important values, the differences are within 7.36%, which supports the conflict management significance amongst the manager attributes. The networking ability is the attribute with the third-biggest deviation (20.36%), which in all cases shows a large difference from the purchasing manager (91.34%). The distribution manager's – that is, the following one in the row – 7.55% lower value, then the logistics manager's more than 10.5% difference and the warehouse manager's 20.36% decrease

support this idea, although the exact causes are not clear and could be examined in future research, as in the case of the other significant differences. Teamwork today belongs to almost all positions' fundamental expectations, and, although we have already mentioned it, we would like to highlight that students found it to be the most important for the production manager (87.11%), along with the ability to control and evaluate and management skills. The 6.76% difference also supports the idea that students find it important too, for every manager, in spite of the significant differences for the logistics and purchasing managers. The following is the only ability that is the most expected for the warehouse manager: the ability to follow the rules in this case (86.02%) shows a 6.89% difference from the lowest and a significantly deviating value from that of the logistics manager (79.13%). However, in the case of the distribution and the purchasing manager, we already consider the not quite 4% to be a significant deviation.

After the assessment interval of the negotiation skills (28.94%), the second-largest category is the presentation skills, which students classified as being expected most of all from the logistics (78.37%) and the distribution manager. The 3.71% difference between the two does not yet belong to the significantly deviating category; however, the assessments of the production (69.59%) and the warehouse manager (57.47%) do by all means. Customer orientation is the competency with the fifth-widest scale, which was proved in the course of the test by the difference between the distribution manager (82.85%) and the 17.05% lower-rated warehouse manager.

Evaluation of the results

In summary, the systems approach and the management skills obtained significantly higher values for the logistics manager, for whom the most important competencies are decision-making ability, consistency, stress management, and presentation skills. In the light of this, we accept hypothesis H1, which was set up to determine the most important criteria for a logistics manager. Furthermore, since, compared with the purchasing manager, there was a significant decrease of values for communication skills, negotiation skills, conflict management, and networking skills, we also accept hypothesis H2, which was formulated regarding the expectations of a purchasing manager. Therefore, the significantly higher values for negotiation and communication skills in the case of the purchasing manager show the students' awareness of the labour market expectations. For the logistics manager, the ability to control and evaluate and teamwork differed

significantly from the values for the production manager, and, in the ability to follow the rules, we can see a significant difference from the warehouse manager's result. Thus, we can say that the scores of the students' research vary between 93.98% (negotiation skills of the purchasing manager) and 57.47% (presentation skills of the warehouse manager), which we present in the diagram (Figure 1). The test results were always specialized with regard to the given competency, since it is possible that a 2–3% difference is already significant in one field, while even a 4–5% difference does not count as significant in another (e.g. regarding the business approach, the purchasing and distribution managers' 4.71% difference is quite large, yet the test did not indicate this, while, for the system approach, the 2.11% difference between logistics and production counts as significant).

In the assessment of the competencies, six fields showed a difference between the highest and the lowest value between 14.05% and 28.94%. The biggest difference appeared in the assessment of negotiation skills, close to 30% in favour of purchasing (93.98%) against warehousing (65.04%). The presentation skills differed by more than 20.9% between the logistics manager (78.37%) and the warehouse manager (57.47%). For the networking skills, there was a 20.36% difference between purchasing (91.34%) and warehousing (70.98%). It is also interesting that the business approach, albeit with just over 1%, seems to be more important for a purchasing than for a logistics manager, not to mention the 19.61% lower value for the warehouse manager. Regarding customer orientation, this difference is 17.05% between the distribution and the warehouse manager, in favour of the former. Communication skills are at the end of the row among the outstanding values, with a 14.05% difference between the purchasing and the warehouse manager. Therefore, we can say that, according to the students, in the case of the warehouse manager, except for the ability to work in a team and the ability to control and evaluate, the competencies are significantly less expected. Furthermore, we can remark that the ability to follow the rules was the only one with the highest assessment for the warehouse manager.

Based on the results, it is apparent that the most and least important competencies for a logistics manager are the system approach (92.08%) and customer orientation (78.11%). For a purchasing manager, negotiation skills (93.98%) and customer orientation (82.04%) are the two extremes. For a production manager, the most important is management skills (92.38%), whilst customer orientation has 69.48% importance. The biggest deviation between the most and the least expected competencies appears for the warehouse manager, specifically in the case of management skills (89.45%) and presentation skills

(57.47%). In the case of the distribution manager, these extreme values are shown by management skills (90.73%) and presentation skills (74.66%).

Conclusion

The main motivation of our research was to raise awareness of the competencies required for employment in the supply chain field – aided by contrasting the latest (ESCO, 2020) and the former international research (Keller, 1999) with the results of our research. Through this comparison, those skills and abilities that have to be developed to help students' gain employment and prepare to meet the labour market expectations were emphasized.

We made some suggestions regarding their preparation and utilization of the results. Our results reflect students' evaluation of the competencies required in the fields of the supply chain. This information can be implemented in several ways in the course of training. 1) With the involvement of students: informing students of the results of the research (confrontation), then providing an opportunity for them to offer their opinions. Students would have the possibility individually but also in groups to make development suggestions (educational methodology, the promotion of raising awareness, and the collecting and sharing of professional experience). These suggestions would be evaluated by professors and company managers (in the SCM field) both individually and jointly, and the best ones could be implemented in the curriculum. 2) With the involvement of professors: the knowledge of the results, on the one hand, can help them in choosing the competency-developing methods to be applied in classes, which could increase the effectiveness of the training; on the other hand, it could help to adjust the students' ideas to the market expectations, facilitating the establishment of consistency between the parties. In our opinion, it is important to inform students about the aim of each applied method and its role in achieving practical effectiveness. The methodological support of the professors would be ongoing in the meantime. 3) With the involvement of dual partners and other involved business managers: If employers know the students' perceptions, then, on the one hand, with the help of lectures, they could broaden the minds of students regarding the expected requirements, and, on the other hand, with targeted training and mentoring programmes, they could prepare for the reception of freshly graduated students.

The investigation pointed out numerous differences and accordance between the expected and the assumed competencies. These were supported by the accepted hypotheses, and

the extreme assessments were discussed in detail when introducing the results. For instance, presentation skills, according to the students, are the least important for the warehouse manager, while, according to ESCO, they appear here and for the distribution manager as an expectation.

Consequently, there are fields and competencies for which students have to be made aware of the importance and assessment and which have to be developed for them to become marketable employees. The competencies published by ESCO (2020), containing the market expectations of the supply chain, surpass in detail the lists of employer expectations available so far, which we can subordinate to the competencies that we used as umbrella terms, so the labour market expectations used by ESCO regarding purchasing, production, warehouse, distribution, and logistics managers can be classified into the 17 competency groups that we examined. These groups contain several operations/activities that can be developed to help students to become successful in the labour market. To achieve this, it also helps to distinguish the ESCO-listed competencies according to their specific or generic nature (marked in Annex 4) since, during training, there is a greater possibility to develop the 'generic' competencies – which are not profession specific and can be expected of every manager – while the specific attributes come into view and can be developed when already occupying the given position.

There are limitations to our paper. Unfortunately, since the labour market expectations are swiftly changing and percentile results indicating employers' opinion are not available, there is no possibility of setting up a ranking like that in the case of students. Thus, the next step would be to question employers and set up a new database in accordance with the market needs, taking into consideration each level of national and international education and the levels of the positions. Most of the examined competencies are such skills and abilities that can be said to be generally expected of managers; therefore, in secondary and higher education, more attention should be paid to the problems of educational methodology as, with clarification, soft skills – which are becoming more important – can be developed more effectively.

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3.4. Paper 4. Student competencies in Supply Chain Management: Expectations and reality

Abstract

The ever-changing competency expectations and human resource shortages in the Supply Chain (SC) field underpin the relevance of our research. Both issues require the attention of all stakeholders (students and universities at the supply side, and employers at the demand side).

Therefore, the aim of this study is to use an inductive approach to help students wanting to enter the field of Supply Chain Management (SCM) to increase their preparedness by mapping the employer experiences and competency expectations.

In 2021 in Hungary, 64 corporate middle managers participated in the online questionnaire and shared their experiences of the competencies of recent graduates.

Using quantitative research, the results shed light on the most expected competencies, the increasingly important role of soft skills, the significant differences between the expected and the experienced traits, such as complex mindset, systems approach, humility and conflict management.

With the revealed results, this study contributes to the professional literature in two ways. On the one hand, it provides up-to-date data about employers' opinion of graduated students, which is rare in the literature. On the other hand, it helps to see the possible causes of the discrepancy between supply and demand in the SC labour market.

Keywords: higher education, logistics, supply chain management, supply and demand, skills, competency, labour market

UDC:331, 378

Introduction

One third of the current jobs could dramatically transform within the next five years, with some of the required knowledge and skills becoming redundant while the demand for new skills increases. It is therefore crucial that the changing competency expectations, which may be generated by technological developments but also by the pressure related to the shortening of order fulfilment times (Chung et al., 2018) closely linked to the growth of e-commerce, are constantly perceived by education providers.

Nowadays, the labour market of the transport and storage industry is facing labour shortages and unemployment at the same time in Hungary. In 2021, the number of vacancies per quarter is on average 1.85% (ksh.hu, 2022). The occurrence of this situation may have been caused by the discrepancy between labour supply and demand, the dynamics of its change, the constantly changing labour market requirements, the inadequate skills, attitudes and expertise (competency) of the employees, as well as the fact that the labour market's demand for human resources raised faster than the number of adequately qualified graduated people in the field of SCM, for example, due to the Covid pandemic.

In our research, we focus on the causes of this discrepancy by investigating the employer expectations (demand side) and the student competencies (supply side) to see where to intervene to reach a better match between the two sides. Our goal is, to influence SCM training, which hopefully will help to meet the expectations of the industry and narrow the gap between supply and demand.

As argued by Dubay et al. (2019) "empirical research on supply chain skill gaps is scant" (p. 144), which indicates the need for this kind of research. We have to know the nature and magnitude of the problem before taking corrective actions.

Therefore, in our research, we sought to answer the following questions:

RQ1 (RQ5 in the „big" research): Which competencies do employers expect from graduated students?

RQ2 (RQ6 in the „big" research): Which competencies are experienced by employers?

RQ3 (RQ7 in the „big" research): Where do employers see discrepancies between their expectations and the current competencies of graduated students'?

Definitions and literature review

In this chapter we define the field and the researched topic (competencies) and then see what the literature have so far done.

The field of supply chain management

Before presenting the results, we should define the field (SCM) we are investigating. To do that, we use the definitions of professional organisations most closely associated with the field.

The Council of Supply Chain Management Professionals (CSCMP), which used to be the Council of Logistics Management till 2004, defines supply chain management as follows: "Supply chain management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all logistics management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers, and customers. In essence, supply chain management integrates supply and demand management within and across companies." (CSCMP website, 2023). The CSCMP also defines logistics as "part of supply chain management that plans, implements, and controls the efficient, effective forward and reverses flow and storage of goods, services and related information between the point of origin and the point of consumption in order to meet customers' requirements" (CSCMP website, 2023). Based on these definitions, the major areas of SCM are procurement, manufacturing (conversion) and logistics (including warehousing, distribution and reverse flow activities). Based on research, competency related studies usually cover the purchasing and logistics areas (Dubey et al., 2019).

Competency

The literature lacks a clear definition of the term competency and also shows inconsistent use of the term (Kotzab et al., 2018, Munkácsi, 2021).

Table1.: Competency vs. Competence

No	Term	Main Focus	Definition
1	Competence Competences	Task - Job	Competences are the tasks a person is capable of performing
2	Competency Competencies	Person	Competencies are the personal characteristics which make work performance possible

Source: Bozkurt (2009)

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In our research we use the term competency (competencies) from Table 1. Competencies are usually represented as a combination of components such as knowledge, skills, abilities, capabilities and resources (Athey, Orth, 1999; Prahalad, Hamel, 1990; Sanchez, 2004; Munkácsi, 2021, European Union, 2006; ESCO, 2020).

We adopt the definition of competency used by ESCO (2020), and the Council of the European Union (2006): "The proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations, and in professional and personal development. It is one's ability to combine knowledge, skills, and attitude (KSA) to show the expected behaviour when performing a professional task." European universities also use this KSA system to form their assurance of learning outcomes.

According to Gruzdev et al. (2018), Myers et al., (2004), formal skills and theoretical knowledge acquired during university studies are less important for effective work in business than personal qualities. However, the development of these qualities does not yet meet the expectations, which is also supported by the dissatisfaction of the students. Today, the expectation presented in the "Iceberg model" of Spencer et al. (1993) is more and more confirmed, where selection based on personality traits is the basis of efficiency because professional knowledge can be easily acquired.

The research presented above thus supports the growing importance of soft skills and the relegation of professional knowledge to the background, which is now noticeably complemented by the expectations related to attitudes.

Competencies required in the areas of SCM

Since in the last years, employees with the right competencies are of increasing strategic importance, individual competencies receive more and more attention in SCM research (Hohenstein et al., 2014; Dubey et al., 2019).

Bak et al., (2019); and Ellinger & Ellinger (2014) treat it as a fact that soft skills are becoming increasingly important in the logistics sector. Moreover, they have indicated that key hiring decisions tend to focus on soft (interpersonal and relational) skills, while hard skills have become a standard requirement (Kuzminov et al., 2019; Bak et al., 2019). Competency is a key factor in achieving excellent performance and competitiveness in the supply chain (Derwik, Hellström, 2017).

The biggest challenge for training institutions today is therefore to establish and maintain close cooperation with the companies involved, to identify new demands and expectations in the labour market, to monitor changes, to react to them as quickly as possible and to equip the students with the competencies that meet the market demand. (Thai, 2012). In the literature, however, we do not find much research, which address this problem by discovering the gap between required and experienced competencies. Required competencies (see Table 2) are more frequently screened.

The competencies are approached in different classifications. Derwik et al., (2016), in their research, grouped the competencies used by managers working in different areas of SCM into five broad categories: business managerial competence (30-40%), generic competence (20-30%), behavioural competence (15-30%), functional competence (5-20%), SCM expertise (0-5%). Clearly, the functional knowledge and expertise of SCM seems to be the least required competencies. In the framework of Myers et al. (2004), the four types of skills were social skills, decision-making skills, problem-solving skills, time management skills. We reorganized the different classifications according to the knowledge-skills-attitude (KSA) breakdown and are summarised in Table 2.

Table 2. Required competencies (KSA)

References	Required competencies (KSA)
Derwik, Hellström, 2017; Flöthmann et al., 2018; Jordan, Bak, 2016; Karttunen, 2018; Kotzab et al., 2018; Murphy, Poist, 2006; Thai, 2012	Hard skills: computer/software skills, financial management, foreign language, analytical skills, cost control, Knowledge about: basic logistics, mathematics, professional experience, logistics related regulations, basic technology, business ethics, local and international business regulation, sustainable logistics systems, reverse logistics, impact of globalisation, modelling of operating systems
Bak et al., 2019; Derwik, Hellström, 2017; Jordan, Bak, 2016; Karttunen, 2018; Murphy, Poist, 2006; Thai, 2012; Kotzab et al., 2018; Flöthmann, et al., 2018	Soft skills: decision-making skills, business communication, teamwork, ability to plan, interpersonal relations, problem-solving skills, time management, intercultural management, leadership, infrastructure planning and management, collaboration, innovation and entrepreneurship, stress management
Bak et al., 2019; Jordan, Bak, 2016; Murphy, Poist, 2006; Karttunen, 2018; Kotzab et al., 2018	Attitude: motivation, proactivity, flexibility, adapt to change, learning to learn, enthusiasm, self-confidence

KSA=Knowledge-Hard skills, Soft skills, Attitude

Source: own compilation

In 2014, the Hungarian Association of Logistics, Purchasing and Inventory Management mapped the expectations and experiences of logistics career starters in the Hungarian market by an online questionnaire. The most important soft skills appeared to be

motivation, diligence and learning ability, while the least important category was stress tolerance. The experience of the employers has shown that the areas where graduates should improve the most are precision, diligence, adaptability, shyness, resilience and excessive self-confidence. Docility and easy integration into the existing organisation met the expectations well. In sum, the experience scores were on average lower than expected, which not only confirmed the existence of a market gap between education and practice, but also suggests companies' reservations towards recent graduates. This gap and the lack of systematic research investigating the gap initiated our research.

Research Methodology

The basis of the online quantitative research and the determination of the examined competencies in this study was provided by literature research (EU, 2006; Hofstra et al., 2020; Derwik et al., 2016; Derwik, Hellström, 2017; ESCO, 2020; Flöthmann, Hoberg, 2017; Munkácsi, Demeter, 2019; Patóné, 2006; Pató et al., 2021; Thai et al., 2011).

Employers were asked about 32 competencies based on the literature sources listed in Table 2. The competencies and their values are listed in Table 4. Following the definition of SCM provided by CSCMP, we asked managers of any field of SCM to answer the questionnaire. The question to be answered, which gave the results of Table 4: "In your opinion, which competencies (competency = knowledge / proficiency + attitude + skills / abilities) should a recent graduate possess and to what extent when applying TO YOUR FIELD? (1: Not at all, 5: Fully).

The online questionnaire was delivered to the stakeholders through several steps (weekly newsletter, Facebook, LinkedIn) but only the personal inquiry (was made via email or LinkedIn) led to results. More than a hundred people started to fill in the questionnaire, but some of them did not finish, so we ended up with a total of n=72. Respondents also indicated the area they manage (procurement, manufacturing, warehousing, distribution, logistics, inverse and other areas). Since many respondents do hold managerial positions in more than one area, that is why the number of individual responses add up to 101 (more than the number of the 72 respondents). The distribution of responses is presented in Table 3.

Table 3. *Distribution of employer survey responses on specific areas of SCM*

Procu-rement	Ware-house	Manufac-turing	Distri-bution	Reverse	Logistics and distribution managers	Other fields of SCM	Sum
12 (12%)	20 (20%)	10 (10%)	17 (17%)	2 (2%)	27 (26%)	13 (13%)	101 (100%)

Source: our own research (2022)

Among the respondents belonging to other categories, you can find providers of shipping, international shipping, lean management (and industrial engineering), complex logistics services, CEP (currier, express, parcel).

Findings

In the following we provide an overview of the competencies that employers require of recent graduates and what they experience (expectations vs. reality). Significance testing and rank correlation were used to analyse the difference between expectations and reality.

Table 4 contains the 32 examined competencies. The list was created based on the literature. The competencies are arranged according to the most expected. The table contains the results of the significance test between expectations and reality (non-significant values marked with:*), and the strength of the existing relation between the order of expectations and reality, using rank correlation. The strong values of the rank correlation demonstrate that the competencies the graduates possess meet the expectations.

Table 4. *Student competencies in SCM: the Employers' Opinion*

No.	Competencies	Skills required	Experien-ced skills	Wilcoxon Signed Ranks Test Asymp. Sig. (2-tailed)	Rank Correlation ϱ=.80-1.0 "Very strong"
1	positive approach	4.68	3.74	,000	0.817
2	agility, being motivated	4.47	3.74	,000	0.804
3	communication skills	4.36	3.59	,000	0.790
4	willingness to experiment and innovate	4.36	3.74	,000	0.778
5	complex mindset, systems approach (develop..., plan.. , analyse)	4.35	2.70	,000	0.761

6	ability to use IT tools and software	4.24	3.97	,041	0.812
7	curiosity	4.23	3.89	,015	0.751
8	ensure cross-department cooperation	4.06	3.26	,000	0.728
9	creativity	4.02	3.45	,000	0.706
10	liaise with managers	3.97	3.02	,000	0.686
11	time management	3.97	3.14	,000	0.686
12	humility	3.95	2.79	,000	0.727
13	ability to analyse (large data sets)	3.88	2.95	,000	0.736
14	ability to plan (costs, stocks, customer needs, production)	3.88	2.76	,000	0.732
15	conflict management (liaise with colleagues)	3.86	2.73	,000	0.747
16	self-confidence*	3.86	3.73	,293	0.765
17	ability to follow rules (comply)	3.83	3.41	,007	0.785
18	organisational skills (manage staff)	3.71	2.97	,000	0.808
19	critical thinking	3.68	3.05	,000	0.807
20	ability to manage resources, inventories, costs, risks	3.48	2.71	,000	0.808
21	administrative skills*	3.48	3.47	,817	0.824
22	ability to control (monitor)	3.47	2.86	,000	0.860
23	ability to supervise	3.32	2.91	,001	0.863
24	skills for corporate development	3.27	2.47	,000	0.867
25	risk assessment skills (procurement risk ...)	3.21	2.30	,000	0.866
26	negotiation skills	3.12	2.67	,006	0.873
27	ability to train people	2.97	2.42	,001	0.881
28	ability to make forecasts (financial, dividend, economic trends)*	2.74	2.59	,353	0.878
29	management skills	2.64	2.14	,000	0.875
30	ability to build professional networks*	2.64	2.44	,140	0.862
31	ability to create contracts*	2.20	2.05	,244	0.851
32	ability to facilitate recruitment*	1.88	2.09	,139	0.824

significant difference: - p< .05
ϱ=,80-1,0 "Very strong"

Source: own research (2022)

Discussion

It can be said that the most expected competencies (RQ1) are positive attitude, agility, motivation, openness to innovation and change, time management (for work), the ability to use software and IT tools, curiosity, ensure cross-department cooperation, creativity. These required competencies mirror the dynamic changes of the environment, which requires flexibility and quick adaptation from employees. Furthermore, the computer skills became extremely important due to the digital transformation of the whole economy.

The least expected qualities are mainly leadership qualities, such as ability to train people, ability to make forecasts (financial, dividend, economic trends), management skills, ability to build professional networks, ability to create contracts, ability to facilitate recruitment. In our opinion, these competencies can best be developed at work and fresh graduates usually do not start as managers, so these abilities are not expected anyway from them.

Regarding the experienced competencies (RQ2), the students show the best performance in ability to use software and IT tools, curiosity, positive approach, agility and openness to innovation and change. Important result, that self-confidence is also relatively strong. On the one hand, the relatively high value of self-confidence might mirror a negative opinion from the employer side since they might feel baseless over-confidence from the students sometimes. On the other hand, it might be a good sign since the Hungarian education traditionally emphasize the mistakes and lacking instead of strengthening the good values of students.

Based on the significance test, except for six competencies (ability to facilitate recruitment, administrative skills, self-confidence, ability to make forecasts, ability to create contracts, ability to build professional networks), there is a remarkable difference between expectations and experiences (RQ3). The average deviation is 0.75. Only in the case of the ability to facilitate recruitment is experience better than expectations (but not significantly). The values of the correlation indicators show a very strong relation between the two categories, which confirms the adequacy of the developed competencies

to market expectations. In other words, even if there are significant differences between expectations and experiences, still the more expected competencies are better than the less expected ones.

However, the significant differences draw attention to the fact that the degree of development must be adjusted to market expectations with greater emphasis. The most expected competencies (up to a value of 4) are mostly soft skills, which are more difficult to develop in training. Native and foreign language communication, complex mindset, systems approach, the use of software ability to analyse and IT tools are in our opinion, skills that can be developed in training and are not typical managerial competencies.

In the case of the complex mindset the huge deviation may, for example, be due to the structure of the education system, which treats each subject separately already in primary school and does not provide an opportunity to "cross-over" between them. At the university level, close cooperation with industry, e.g. by studying and working through specific cases, problems and questions, and applying a complex mindset to answer them, with systems approach, can help to replace this approach. This is why the case study is very popular as a teaching methodology tool in many cases. It also plays an important role in the competency development of the future logisticians, since an example from life/industry can also help to a great extent to meet the expectations showing the greatest deviation come to the fore in our research. The situations described in the case studies are therefore very important, because they allow students to get to know the tasks they are facing and during their solution they can develop the necessary competencies such as complex mindset, ability to use IT tools, ability to plan and analyse, risk assessment skills, time management, communication skills.

A weakness of the research is that it did not differentiate between the level of the positions held, because the position was not the subject of the research, it only asked for the general opinion of the regional managers about the master's degree students. We did not investigate the competencies of bachelor's degree graduates or whether managers could/would differentiate between BA/MSc. The focus was on the positions that a recent graduate could fill in the given field. As further research directions, among qualitative methods, interviews and focus group discussions are possible within and between all three stakeholder groups.

Conclusion

In this paper we have shown, based on an online survey of 72 Hungarian supply chain managers what are their expectations of freshly graduated students and what reality they see.

It has been confirmed and is extremely important that soft skills are progressively becoming a requirement, more and more valued compared to professional knowledge, and that competency expectations are constantly changing. Hard skills are treated by employers as obvious or quick to learn. The development of appropriate competencies has become an essential element of both management and the organization of higher education. One of the tangible proofs of this is the competencies that can be found in the exit criteria of each course, which students need to possess to graduate.

The increased interest in SCM education and the changing environmental factors suggest that existing cooperation needs to be maintained, deepened, and expanded to ensure further relevant SCM education. The aim is therefore to train a "marketable" student, which entails the reorganising of the training structure, the redefinition of the training output requirements, and the rethinking of the roles of professors.

Furthermore, social and economic changes require new competencies, which will call for a continuous review of the subject in the future.

This is why it is important that the educational system and, beyond that, the graduates meet these expectations as much as possible. The economic impact of logistics requires the use of more effective teaching methods, such as interactive learning, group projects, internships, periodical collaboration, etc. - which allow students to solve realistic problems independently, which deepens the acquired knowledge -, of which Munkácsi, Demeter, (2019) provides a more detailed overview. We note that logistics must be constantly reinterpreted over the years. For this reason, it is important that educational methods adapt to the changing industrial environment.

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5. Annex

1. Expected <u>specific</u> competencies in certain areas of supply chains based on Keller (1999)

Expected competencies in purchasing	Expected competencies in warehousing	Expected competencies in production	Expected competencies in distribution	Expected comprehensive competencies in the logistics field within the company
use of communication techniques	*Warehouse inspector:*	decision-making ability	control ability	*Logistics managers:*
use of conflict, and stress management techniques	ability to train people	ability to control	developmental ability	ability to build, maintain, and develop a logistics organization
ability to conduct meetings	ability to control (ability to evaluate performance)	developmental ability	effective decision-making ability	selecting, developing, motivating, and controlling the right people
	communication skills	time management ability	time management ability	team-building ability
	ability to motivate	excellent communication skills	selection, and recruitment ability	communication, presentation skills
	stress management	ability to motivate	communication skills	decision-making methods, and techniques
	time management ability		ability to teach others	*Supply Chain Manager:*
	user-level management of technical devices		leadership skills	comprehensive vision
	organizational skills			stress, and conflict management
	Warehouse manager in addition to these:			project management skills
	decision-making ability			communication, presentation skills
	presentation skills			organizational skills
				effective decision-making ability

Source: Munkácsi and Demeter (2019); own compilation (2020)

2. Expected <u>specific</u> competencies in certain areas of supply chains based on Patóné (2006)

Expected competencies in purchasing	Expected competencies in warehousing	Expected competencies in the field of transport and material handling	Competencies related to comprehensive logistics within the company
comprehensive vision	endurance, adaptability	emotional stamina	information management, organizational awareness
team-building ability	well-groomed, good-looking, reviewing ability	technical sense	initiative skills
ability to control	extroversion, attention		creativity
responsibility	conflict management		logical thinking
expressiveness	consistency		confident attitude
risk-taking skill	directness		quality awareness
complex mindset	solvency, methodicality		being motivated
negotiation skill	systematism		work organization ability
company-level mindset	professional aptitude		independent work
customer orientation	courtesy		flexibility

Source: Munkácsi and Demeter (2019); own compilation

3. Categories and grouping of the 23 personal competencies in the EU's research programme (2006)

Key competences	Work competences	Management competences
communication	flexibility	leadership
quantification skills	creativity	ability to motivate others
teamwork	early independent decision making	the ability to learn from mistakes
problem-solving ability	knowledge of foreign language(s)	ability to handl contacts, and build new contacts
ability to learn, and develop performance	confidence	ability to influence others
	critical approach	ability of decision making
	ability to explore new opportunities	ability to focus on the results, and the execution of processes
	responsibility	ability to build strategies
	capacity to act	ethical approach

Source: Fabulya et al., (2017); own compilation

4. ESCO's fundamentally and optionally expected competencies in certain fields of logistics marked as 'Generic (G)' and 'Specific (S)' competencies

G/S	Essential skills and competences logistics and distribution manager	G/S.	Essential skills and competences purchasing manager	G/S	Essential skills and competences warehouse manager	G/S	Essential skills and competences industrial production manager	G/S	Essential skills and competences distribution manager
S	analyse relation between supply chain improvement and profit	S	analyse logistic changes	G	apply safety management	G	adhere to organisational guidelines	G	adhere to organisational guidelines
S	analyse supply chain strategies	S	analyse supply chain strategies	G	build business relationships	S	adjust production schedule	S	carry out inventory control accuracy
S	analyse supply chain trends	S	analyse supply chain trends	G	coach employees	S	assess impact of industrial activities	G	carry out statistical forecasts
S	anticipate the overhaul of the fleet	S	assess supplier risks	G	comprehend financial business terminology	S	check material rescources	S	communicate with shipment forwarders
S	communicate with shipment forwarders	S	coordinate purchasing activities	G	create a work atmosphere of continuous improvement	G	control financial resources	G	create solutions to problems
G	comply with checklists	S	estimate costs of required supplies	G	create solutions to problems	S	create manufacturing guidelines	G	develop financial statistics reports
S	conduct full-scale emergency plan exercises	G	follow company standards	S	ensure efficient utilisation of warehouse space	S	define quality standards	S	ensure customs compliance
G	consider economic criteria in decision making	S	identify suppliers	S	ensure stock storage safety	G	liaise with industrial professionals	S	ensure regulatory compliance concerning distribution activities
S	control reorder points	G	issue sales invoices	G	exert a goal-oriented leadership role towards colleagues	G	manage budgets	S	forecast distribution activities
S	coordinate dock operations	G	liaise with managers	G	give instructions to staff	S	manage resources	S	handle carriers
S	develop efficiency plans for logistics operations	G	maintain relationship with customers	S	identify software for warehouse management	G	manage staff	G	have computer literacy
G	encourage teams for continuous improvement	S	maintain relationship with suppliers	G	improve business processes	S	manage supplies	G	implement strategic planning
G	ensure continuous preparedness for audits	G	manage budgets	G	maintain financial records	G	meet deadlines	G	manage financial risk

G	give instructions to staff	G	manage contracts	S	maintain physical condition of warehouse	S	oversee assembly operations	S	manage freight payment methods
G	handle stressful situations	S	manage inventory	S	maintain stock control systems	S	oversee production requirements	G	manage staff
G	liaise with colleagues	S	negotiate buying conditions	S	maintain warehouse database	S	plan health and safety procedures	S	minimise shipping cost
S	liaise with transportation companies	S	negotiate sales contracts	S	manage dispatch software systems		Optional skills and competences industrial production manager	S	perform financial risk management in international trade
S	manage dispatch software systems	S	order supplies	S	manage inventory	S	adapt production levels	G	perform multiple tasks at the same time
G	manage staff	G	strive for company growth	G	manage staff	G	analyse goal progress	G	perform risk analysis
S	manage the fleet according to planned operations	S	study sales levels of products	S	manage third-party logistics providers	S	analyse production processes for improvement	S	plan transport operations
G	*perform cost accounting activities*		Optional skills and competences purchasing manager	S	manage warehouse operations	S	analyse supply chain strategies	S	track shipments
G	provide operational efficiency training to employees	G	analyse consumer buying trends	S	manage warehouse organisation	S	assess supplier risks	S	track shipping sites
S	solve operational transport problems	S	assess procurement needs	S	meet productivity targets	S	check quality of products on the production line		Optional skills and competences distribution manager
S	work in a logistics team	G	attend trade fairs	S	monitor security procedures in warehouse operations	S	check quality of raw materials	G	ensure customer focus
	Optional skills and competences logistics and distribution manager	S	calculate purchasing levels of raw materials	S	monitor storage space	S	define manufacturing quality criteria	S	manufacture ingredients
S	check dangerous goods transport unit	G	carry out statistical forecasts	S	oversee freight-related financial documentation	G	develop business plans	S	monitor security procedures in warehouse operations
G	cooperate with colleagues	S	ensure equipment availability	S	oversee warehouse	S	develop manufacturing policies	S	monitor stock level

					value-added activities				
S	coordinate export transportation activities	S	implement procurement of innovation	G	*perform cost accounting activities*	G	inspect material	S	oversee freight-related financial documentation
S	coordinate import transportation activities	S	implement sustainable procurement	S	plan future capacity requirements	S	schedule production	G	present reports
G	have computer literacy	G	maintain contract administration	S	plan the dispatching of products			G	speak different languages
S	identify software for warehouse management	S	manage procurement planning	S	plan the stocking of products			G	think proactively
S	improve rail service delivery	S	manage rented goods returns	S	provide staff training in warehouse management			G	train employees
S	liaise with port users	G	manage staff	G	schedule shifts			S	use a warehouse management system
S	oversee warehouse value-added activities	S	manage supplies	G	train employees				
G	show confidence	S	monitor stock level	S	use a warehouse management system				
G	use different communication channels	S	perform procurement market analysis	G	use different communication channels				
		S	promote sustainable management	S	work in a logistics team				
		G	recruit employees		Optional skills and competences warehouse manager				
		G	track price trends	G	act reliably				
		G	train employees	G	analyse work-related written reports				
		S	use e-procurement	S	carry out storage risk management				
				S	ensure safety conditions in storage rooms				

				G	have computer literacy				
				G	maintain updated professional knowledge				125
				G	manage budgets				
				G	perform services in a flexible manner				
				G	present reports				
				G	show confidence				
				G	supervise the work of staff on different shifts				
				G	use logical reasoning				

5.   Examination of competencies and educational metodology in logistics educations

(Student questionnaire)

Q1.1 **Dear Respondent!** 21st century educators must meet a number of criteria and challanges in a rapidly and constantly changing economic, social and information environment.
The strictest expectations and criteria are formulated by the students and the potential employers.
As a PhD student of Corvinus Univertity of Budapest and as an economics teacher, in my reasearch I was looking for an answer for the following questions. According to a **logistics student from the generation „X", „Y" and „Z"**
1/which **competencies** should a professional working in the fields of the supply chain (**procurement, manufacturing, warehousing, distribution**) have, and
2/ during their training what **educational methods** they have / haven't encountered, which **helped** to **develop the competencies** expected by the employers.

Filling in the questionnaire is **anonymus** and it only takes **a couple of minutes. Thank you** very much for your help in advance!

Q2.1 Personal data

Female

Male

Q2.2 Age

▼ 18-20 (1) ... 50- (7)

Q2.3 The education level in which you participate..

OKJ

BSc

MSc

Other: _____

Q2.4 The name of the specialty / training

Logistics operator

Logistics and freight forwarder executive

Supply Chain Management

Other:_____

Q3.1 According to you, how much can the below listed COMPETENCIES be expected from a LOGISTICS MANAGER?
negotiation skills (1)
collaboration skills (2)
systems approach (3)
teamwork skills (4)
communication skills (5)
interpersonal skills (6)

presentation skills (7)
organisational skills (8)
leadership skills (9)
decision-making ability (10)
business awareness (11)
customer orientation (12)
ability to handle conflicts (13)
stress tolerance (14)
ability to follow the rules (15)
ability to control and assess (16)
consistency (17)

Q3.2 According to you, how much can the below listed COMPETENCIES be expected
from a PROCUREMENT MANAGER? (0-100)
negotiation skills (1)
collaboration skills (2)
systems approach (3)
teamwork skills (4)
communication skills (5)
interpersonal skills (6)
organisational skills (7)
leadership skills (8)
decision-making ability (9)
business awareness (10)
customer orientation (11)
ability to handle conflicts (12)
stress tolerance (13)
ability to follow the rules (14)
ability to control and assess (15)
consistency (16)
other: (17)

Q3.3 According to you, how much can the below listed COMPETENCIES be expected
from a MANUFACTURING MANAGER? (0-100)
negotiation skills (1)
collaboration skills (2)
systems approach (3)
teamwork skills (4)
communication skills (5)
interpersonal skills (6)
presentation skills (7)
organisational skills (8)
leadership skills (9)
decision-making ability (10)
business awareness (11)
customer orientation (12)
ability to handle conflicts (13)
stress tolerance (14)
ability to follow the rules (15)
ability to control and assess (16)
consistency (17)
other: (18)

Q3.4 According to you, how much can the below listed COMPETENCIES be expected from a WAREHOUSE MANAGER? (0-100)
negotiation skills (1)
collaboration skills (2)
systems approach (3)
teamwork skills (4)
communication skills (5)
interpersonal skills (6)
presentation skills (7)
organisational skills (8)
leadership skills (9)
decision-making ability (10)
business awareness (11)
customer orientation (12)
ability to handle conflicts (13)
stress tolerance (14)
ability to follow the rules (15)
ability to control and assess (16)
consistency (17)
other: (18)

Q3.5 According to you, how much can the below listed COMPETENCIES be expected from a DISTRIBUTION MANAGER? (0-100)
negotiation skills (1)
collaboration skills (2)
systems approach (3)
teamwork skills (4)
communication skills (5)
interpersonal skills (6)
presentation skills (7)
organisational skills (8)
leadership skills (9)
decision-making ability (10)
business awareness (11)
customer orientation (12)
ability to handle conflicts (13)
stress tolerance (14)
ability to follow the rules (15)
ability to control and assess (16)
consistency (17)
other: (18)

Q4.1 According to you, can the below listed competencies be developed during education/training? (1: not at all 5: to a great extent, 6: I don't know)
negotiation skills (1)
collaboration skills (2)
systems approach (3)
teamwork skills (4)
communication skills (5)
interpersonal skills (6)
presentation skills (7)

organisational skills (8)
leadership skills (9)
decision-making ability (10)
business awareness (11)
customer orientation (12)
ability to handle conflicts (13)
stress tolerance (14)
ability to follow the rules (15)
ability to control and assess (16)
consistency (17)
other: (18)

Q4.2 According to you, from the below listed competencies which and to what extent has been developed during education/training? (1: not at all 5: to a great extent, 6: I don't know)

negotiation skills (1)
collaboration skills (2)
systems approach (3)
teamwork skills (4)
communication skills (5)
interpersonal skills (6)
presentation skills (7)
organisational skills (8)
leadership skills (9)
decision-making ability (10)
business awareness (11)
customer orientation (12)
ability to handle conflicts (13)
stress tolerance (14)
ability to follow the rules (15)
ability to control and assess (16)
consistency (17)
other: (18)

Q5.1 Which cooperative teaching methods are You familiar with? You can mark more answers!

o   Field trip (1)
o   Applications supporting learning (kahoot, learning apps, mentimeter..) (2)
o   Situational game (3)
o   Short videos (4)
o   Teamwork (5)
o   Project method (6)
o   Conversation for educational purposes (7)
o   Training method (8)
o   Debate (9)
o   Moderation method (10)
o   Case study (11)
o   Guest presenter (12)
o   other: (13)

Q5.2 According to you, to what extent do the listed teaching methods help to develop the expected competencies in the fields of the supply chain (procurement, manufacturing, warhousing, distribution)? (1: not at all 5: fully; 6: I am not familiar with the method, 7: I cannot judge)

Field trip (1)
Applications supporting learning (kahoot, learning apps, mentimeter..) (2)
Situational game (3)
Short videos (4)
Teamwork (5)
Project method (6)
Conversation for educational purposes (7)
Training method (8)
Debate (9)
Moderation method (10)
Case study (11)
Guest presenter (12)
Individual presentation (13)
Group presentation (14)
Group homework (15)
other: (16)

Q5.3 According to you, which teaching methods – from the ones listed below – should be used more often in training in order to further develop the competencies expected in the fields of the supply chain (procurement, manufacturing, warhousing, distribution)?
(1: it should not be used at all 5: it should be used in every class; 6: I am not familiar with the method, 7: I cannot judge)

Field trip (1)
Applications supporting learning (kahoot, learning apps, mentimeter..) (2)
Situational game (3)
Short videos (4)
Teamwork (5)
Project method (6)
Conversation for educational purposes (7)
Training method (8)
Debate (9)
Moderation method (10)
Case study (11)
Guest presenter (12)
Individual presentation (13)
Group presentation (14)
Group homework (15)
other: (16)

6. Competencies expected by employers in the fields of the Supply Chain Management
    (Employer questionnaire)

Q1.1 **Dear Responder!**
In the 21st century's rapidly and constantly changing economic, social and information environment, an MSc student and a lecturer / professor participating in higher education has to meet a number of criteria and challanges.
In my research, as a lecturer of the SUPPLY CHAIN MANAGEMENT MASTERS' DEGREE PROGRAMME at Corvinus University of Budapest, I was looking for the answer to what **competencies** should a „**Z" and „Alpha" generation masters' student** participating in **logistics training** have according to you (as potential employers) – based on the competency groups and key competencies defined by the EU, as well as the competency expectations revealed in international research – in order to be able to find a job in the fields of the SUPPLY CHAIN (**procurement, manufacturing, warehousing, distribution, reverse flow logistics, comprehensive logistics within the company**…).
Filling in the questionnaire is **anonymus,** the data is processed in aggregation.
Please, as the EXPERT of the given field, help my work in making suggestions for improving the training of future employees.
Thank you for your help in advance!
Adrienn Munkácsi

Q2.1 In which area of the supply chain management do you work?

o   Procurement
o   Manufacturing
o   Warehousing
o   Distribution
o   Reverse flow logistics
o   Comprehensive logistics within the compnay
o   Other: _____

Q3.1 The name of the compnay you work for.

    _____

Q3.2 Do you work at a multinational company?

o   yes
o   no

Q3.3 Do you work at a company with Hungarian ownership?

o   yes
o   no

Q3.4 How many employees does the company you work for have? Please answer with numbers.

    _____

Q3.5 In which industry is your company present? Please mark your answer, or in case it is not listed below, enter it in the blank field.

o   Machinery and Automotive
o   Construction
o   Pharmaceutical industry
o   Retail industry
o   Wholesale industry
o   Paper-industry
o   Food industry
o   Service industry
o   Other: _____

Q3.6 What qualifications/degree do you have? What degree do you have?

o   Vocational secondary school
o   High school
o   Technical institute
o   College
o   University
o   PhD
o   Other:_____

Q3.7 Your position at the company

o   Owner
o   CEO
o   Upper management
o   Middle management
o   Team leader
o   Employee
o   Other:_____

Q3.8 How many employees do you manage?

     _____

Q3.9 For how long have you been managing your current colleagues? Please indicate the number of months. (only numbers)

     _____

Q3.10 Are you involved in the selection of new employees applying to the company?

o   yes
o   no

Q4.1 According to your experience, to what extent does a recent graduate applying to your company have the following KEY competencies? (1: Not at all, 5: Fully)

communication (native and foreign language)
quantitative skills
team work
the ability to solve problems

learning and performance development

Q4.2 According to your experience, to what extent does a recent graduate applying to your company have the following WORK competencies? (1: Not at all, 5: Fully)

flexibility, adaptability
creativity
initial independent decision-making
knowledge of a foreign language
confidence
critical mindset
exploring opportunities
capacity to act
responsibility

Q4.3 According to your experience, to what extent does a recent graduate applying to your company have the following LEADERSHIP competencies? (1: Not at all, 5: Fully)

leadership skills
the ability to motivate others
the ability to learn from mistakes
networking skills (with clients and suppliers)
the ability to influence and convice others
decision-making ability
the ability to focus on the results and the execution of the processes
the ability to build a strategy
ethical approach (CSR, sustainability..)

Q5.1 According to you, what competencies (competency=knowledge+attitude+skills/ability) **should** a recent graduate of the „logistics field" **have and to what extent**, in case of applying to your field of work (marked at the first question)? (In case you do not consider the given competency to be imporant at all, leave the value as 1.)
 (1: not expected   2   3: to an extent that can be developed   4   5:   very important expectation)

1. analytical skills (data bases, trends, strategies, business goals..)
2. native and foreign language communication skills
3. complex mindset, systems approach
4. planning skills (costs, stock, customer demands, production)
5. risk assessment skills (procurement risk...)
6. the ability to promote corporate development
7. the ability to follow the rules
8. the ability to manage resources, stocks, costs and risks
9. coordination skills (with the managers..)

10. scheduling skills, time management (work)
11. leadership skills
12. the ability to coordinate and organise
13. training skills
14. the ability to ensure cooperation (within the organisation / department and between departments)
15. the ability to prepare forecasts (financial, divident, economical trends)
16. the ability to supervise and monitor
17. control skills
18. conflict and stress management
19. the ability to create professional networks
20. the ability to create contracts
21. administrative skills
22. negotiation skills
23. the ability to promote recruitment
24. the ability to use softwares and IT tools
25. openness to innovation and change
26. positive approach
27. creativity
28. agility, motivation
29. critical thinking
30. curiosity
31. humility
32. self-confidence

Q5.2 What other competency(s) do you consider important that was not mentioned above?

Q6.1 According to your experience/opinion, do recent graduates applying to your company **have** the above listed expected competencies? If yes, to what extent? (1: they do not have   2   3: to an extent that can be developed   4   5: they meet the expectations)

1. analytical skills (data bases, trends, strategies, business goals..)
2. native and foreign language communication skills
3. complex mindset, systems approach
4. planning skills (costs, stock, customer demands, production)
5. risk assessment skills (procurement risk...)
6. the ability to promote corporate development
7. the ability to follow the rules
8. the ability to manage resources, stocks, costs and risks
9. coordination skills (with the managers..)
10. scheduling skills, time management (work)

11. leadership skills

12. the ability to coordinate and organise

13. training skills

14. the ability to ensure cooperation (within the organisation / department and between departments)

15. the ability to prepare forecasts (financial, divident, economical trends)

16. the ability to supervise and monitor

17. control skills

18. conflict and stress management

19. the ability to create professional networks

20. the ability to create contracts

21. administrative skills

22. negotiation skills

23. the ability to promote recruitment

24. the ability to use softwares and IT tools

25. openness to innovation and change

26. positive approach

27. creativity

28. agility, motivation

29. critical thinking

30. curiosity

31. humility

32. self-confidence