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EVALUATION OF UNIVERSITY STUDY PROCESS USING AHP METHOD

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Abstract. *Purpose* – one of the essential activity of the university is academic study process. The aim of the article to reveal the complexity of the study process and evaluate the significance of the criteria that compose it.

Research methodology – university study process content analysis was based on the concept of Internal Study Quality Assurance for higher education institutions formulated by the Bologna Process. The multi-criteria decision-making method Analytical Hierarchy Process was used to achieve the aim.

Findings – the experts who participated in the research represented three universities. According to experts opinions, we can conclude that the significance of the criteria of the study process is different among different experts.

Research limitations – selection of only one process of university performance – study process – seen as the main limitation of performed research.

Practical implications – the proposed set of indicators can help universities to measure the quality of their study process in order to achieve better performance. These results also could be useful for other Universities.

Originality/Value – based on the research results, there could be proposed a framework of well-grounded indicators for the significant criteria that could provide Universities better understanding in which way to develop the university study process.

Keywords: universities, bologna process, study process, multi-criteria decision-making method, Analytical Hierarchic Process (AHP).

JEL Classification: C02, C19, I23, L2, M14, M21.

Conference topic: Digitalization of Business Process: Trends, Challenges, Solutions.

Introduction

Quality of higher education studies remains an important question for nowadays society. The relationship between personal incomes and educational level obtained is provided on the structure of earnings by governmental statistics agency. The average monthly gross wages and salaries in the country's economy by education in the wage structure clearly show that the wages of those with higher education are the highest (Lietuvos statistikos departamentas, 2016; OECD, 2019). The scientific justification for this phenomenon provides the human capital theory. This theory is considered to be a new concept of modern economic theory, which examines problems of labor force formation and quality (Bagdonavičius, 2002). The human capital theory was formed in the middle of the 20th century. It reflects the problems of qualitatively new labour force formation closely linked to increasing spending on education and increasing the role of the state in the processes of labour force formation.

Jacob Mincer, an American scientist of Polish origin, was one of the founders of the theory of labour economics. He empirically measured the impact of education and experience on person salary levels. It is J. Mincer's merit that education and knowledge are considered to be one of the most important factors of economic growth (Kuodis, 2017).

The second half of the 20th century is also rising of "quality movement" worldwide. It embedded instruments for the improvement and development of the quality of performance in companies and the public sector institutions including higher education institutions. The dimension of quality in higher education gradually developed. It was related to the number of factors but among the most important was the increase in the extent of higher education, i.e., the increase in numbers of institutions and students. The phenomenon of the extent of higher education depends on two essential elements: the rapid growth of the global economy and the development of technologies. Increasing access to

higher education, it's massification, internationalization and market impact were the strongest factors influencing changes within the sector of higher education (Paliulis & Labanauskis, 2015). The increasing competition among universities, the need to create value for stakeholders caused the aim to improve internal activities and high-quality performance of universities (Asif & Searcy, 2014; Dalati, Eddin, & Hamwi, 2016).

It is possible to express a certain quality of studies quantitatively since education (understood in this article as university studies in a higher education institution) is carried out in all universities. But not all of the universities can be treated as high-quality universities (Psacharopoulos, 1996). There are two questions to answer remain: "what university studies are of high-quality" and "how to evaluate and measure the quality of university-level studies" (Labanauskis, Kaparavičiūtė, Davidavičienė, & Deltuvienė, 2018).

During the last few decades, there were many attempts to measure the quality of higher education internationally (e.g. TIMES rankings, QS rankings, Multirank) as well as the national level (assessment and accreditation bodies). The articles aim is to analyze the university study process from a qualitative point of view. The multi-criteria decision-making research method was employed to achieve this aim.

The Standards and Guidelines for Quality Assurance in the European Higher Education Area (ESG) (ENQA, 2015) has served as a background of the analysis of the academic study process at the university level. This frame enabled to structure and analyze different criteria of the study process. The article referred to the one of multi-criteria decision-making assessment method – Analytic Hierarchy Process method (AHP) (Saaty, 1994). The representatives of the two largest universities from Lithuania and one university from Finland have participated in the research.

The research results clearly present the complexity of the university-level study process. Not all of the criteria that the process of composing can be measured quantitatively. Is should be also mentioned that achieve compatibility of expert opinions was difficult to reach.

Despite this, performed research shows a new approach to the assessment of the university academic study process. The results of the research can be useful for modeling and supplying study process in a way to satisfy the expectations of stakeholders and to achieve the highest quality of university studies.

The article is composed of three parts. The theoretical background of the quality of higher education institutions is provided in the first part. The second part disassembles the study process according to the ESG philosophy. As a result of this analysis, the most significant criteria for the study process have been compiled. The last part describes the use of the multi-criteria decision-making research method, research results, and suggestions for future assessment of the stud process at the university level.

1. Theoretical background: a search of quality in higher education institutions

The need to evaluate the study process is not very new. It comes from the efforts to find key elements of the quality of higher education. According to Serafinas, Ruževičius, and Daugvilienė (2008) "The main mission of university education is to meet the needs of the individual and society in terms of cognitive development and excellence" (Serafinas et al., 2008). In contemporary socioeconomic context, the universities perform three inter-related missions: (1) education (university level studies), (2) research and development, and (3) so-called the "3rd mission" that connects university's scientific activities with the external economic and social worlds. Labanauskis and Ginevičius (2017) revealed the complexity of university performance, and the role of stakeholders leading to the development of higher education services in 2017.

There have been a number of attempts to evaluate quality in higher education institutions from different perspectives during the last decades. A wide variety of higher education institutions worldwide have implemented ISO 9001 standard. A number of authors have analyzed the value of ISO 9001 standard accreditation (Papadimitriou & Westerheijden, 2010; Kasperavičiūtė, 2012; Dumond, 2013; Kasperaviciute, 2013; Basir, Davies, J. Douglas, & A. Douglas, 2017).

Searching of quality of universities performance the application of Total Quality Management (TQM) principles and idea of continuous improvement also attracted the attention of researchers (Mehralizadeh & Safaeemoghaddam, 2010; Leskauskaitė & Pivoras, 2012; Asif, Awan, Khan, & Ahmad, 2013; Psomas & Antony, 2017).

Quality Assurance is one of the approaches which has been widely discussed and analyzed by scientists worldwide. Ways and possibilities to integrate students in quality assurance procedures (Elassy, 2013, 2015). A case from Georgia analyses the involvement of academic staff in internal quality assurance in universities (M. Shurgaia & M. Shurgaia, 2015), the quality assurance and national accreditation policy of higher education in Egypt (Schomaker, 2015), the effect of quality assurance in private higher education institutions in China (Cao & Li, 2014) recent reforms in higher education (Bao, Kehm, & Ma, 2018; Alemu, 2019; Mizala & Schneider, 2019) has been reviewed.

Research papers that attempt to validate and expand the quality management model for universities have been reviewed. An analysis of the relationship between university autonomy and control over quality management (Beerkens, 2011), university transformation and external assessment in Finland (Haapakorpi, 2011) and the importance of process management in higher education institutions (Kettunen, 2012). The search for quality can be performed form a university ranking perspective (Agasisti & Johnes, 2013; Erkkilä & Piironen, 2014; Blanco-Ramírez & Berger, 2014). The summary of different scientific approaches to the quality of higher education is provided in Figure 1.

Figure 1. The summary of different scientific approaches to quality of higher education based on literature review (source: compiled by authors)

The variety of different approaches reveals the importance and relevance of the topic to the present. Despite the complex origin of the university it is rational to analyze the possible causes that leading the universities to the quality performance. To achieve this the research was focused on higher education studies as one of the essential university processes.

2. The study process in a contemporary university

The study process at the university seems to be simple only from first sight. The expectations from stakeholders and society to university studies were and remain very high. According to Ruževičius (2014), "the quality of university studies includes personality development, formation of positive value attitudes, development of social, environmental awareness and responsibility, acquisition of professional qualification".

In recent years, the study process at the university level has been widely discussed and studies considering various aspects by scientists in Lithuania (Pukelis, 2011; Juknytė-Petreikienė, 2013) and worldwide (Tsinidou, Gerogiannis, & Fitsilis, 2010; Law, 2010; Narang, 2012; Ardi, Hidayatno, & Zagloel, 2012) analysed.

The study process is composed of many entirely different elements. Different types and forms of studies organization. Study programmes, learning outcomes, a system of progress and evaluation of academic achievements. Involvement students in research activities. The list continued by a need for infrastructure and material resources, IT and library facilities. Huge information blocks such as compliance to student admission conditions, monitoring of students' academic achievements, students' satisfaction with studies, drop-out rates, activities for alumni and monitoring a professional career path of graduates must be ensured. The process involves a wide range of different stakeholders having different expectations and understanding of what kind of studies at the university level are qualitative (Labanauskis & Ginevičius, 2017).

A specific model for the studies at the university level is revealed in the research as an outcome of the complexity and interrelations of the above-listed elements. Also, the economic approach to quality, which is based on the assumption that quality differences are presumed by a predetermined proportion of product components, was taking into consideration.

Following this logic, we were looking for a methodology of extracting and evaluating "the components" of the study process.

The European Standards and Guidelines for Quality Assurance in Higher Education (ESG), developed during the Bologna Process, can be considered as a comprehensive instrument to help universities to ensure the quality of studies they provide (ENQA, 2015). Disassembling of the internal quality assurance of the studies at the university level to subjects and elements is provided in an article by Labanauskis et al. (2018). The teardown analysis has disclosed the complexity of the study process content. A review of the quality assurance approach revealed that the process is consist of 10 subjects with 40 key elements. Most of the research papers that have been reviewed assessing one or a few of the elements from this list. The research was performed towards the direction proposed by the ESG in order to analyze the quality of the whole university level study process.

After analysis of content, descriptions and key terms of internal quality assurance of study process based on ESG provisions the research focus was set on 7 main areas or thematic groups named: quality assurance policy, study programmes, students, teachers (academics), conditions of studies, study resources, information. According to process management philosophy the quality assurance policy is considered as a strategic element of this process. Study programmes, students, teachers (academics) seen as key role players in the implementation of this process. Rest elements such conditions of studies, study resources, information are considered as supportive ones. The graphical visualization is provided in Figure 2.

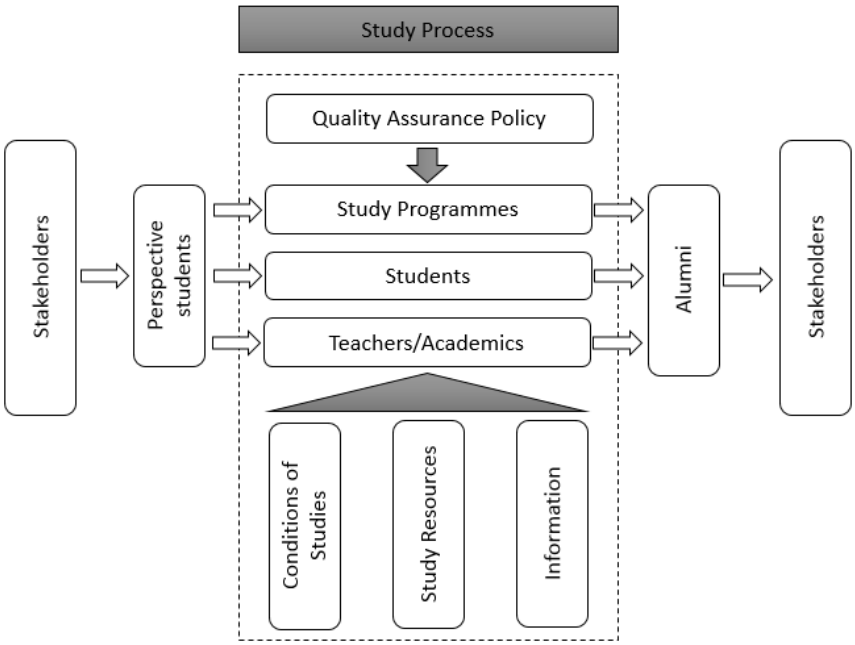

Figure 2. The specification of the university study process the content analysis areas of the (thematic groups) (source: composed by authors)

The next task was to find or formulate the list of criteria that would allow measuring selected areas (thematic groups) in order to explain their importance to the quality of the study process performed by the university. To fulfill this task the multi-criteria assessment research methods were employed.

3. Research methodology and research results

To analyze the study process at the university level in a more detailed way from the qualitative approach, a questionnaire of pairwise criteria for the study process at the university level was prepared and E_k, k = 1, ..., 14, experts from Lithuanian two universities and Finland university were conducted. For expert selection, gender equality was also taken into consideration. The number of men and women experts was equal in the research.

The experts were persons with academic and/or administrative experience, present and former Deans and Vice-Deans of the faculties, Professors and the Heads of study programmes. The questionnaire was made taking into account the concept of the quality assurance of internal studies according to ESG and the analysis of multi-criteria evaluation methods. The study process at the university level was divided into thematic groups D_m, m = 1, ..., 7 each of which comprised 3 to 5 criteria of criteria I_j, j = 1,..., 30 (see Table 1).

Table 1. The specification of the content of the study process (source: compiled by the authors)

Areas (thematic groups)	Criteria (sub-factors)
Quality assurance policy (D_1)	continuous improvement (I_1) quality culture (I_2) accountability (I_3) stakeholders (I_4)
Study programmes (D_2)	learning outcomes (I_5) student workload (I_6) institutional approval (I_7) monitoring and supervision (I_8) changes in external expertise (I_9)
Students (D_3)	motivation, reflection (I_{10}) flexible learning paths (I_{11}) variety of pedagogical methods (I_{12}) independent learning (I_{13}) procedures for student complaints (I_{14})

End of Table 1

Areas (thematic groups)	Criteria (sub-factors)
Conditions for studies (D_4)	student admission (I_{15}) introduction to the programme (I_{16}) student progression (I_{17}) mobility (I_{18}) student certification (I_{19})
Teachers (D_5)	supportive environment (I_{20}) competent teachers (I_{21}) transparent recruitment (I_{22})
Study resources (D_6)	library (I_{23}) IT infrastructure (I_{24}) human support (I_{25})
Information (D_7)	relevant indicators (I_{26}) timely data (I_{27}) student satisfaction (I_{28}) drop-out rates (I_{29}) career paths (I_{30})

To manage a precise assessment of the quality assurance system at the university level, the significance of the components of the quality assurance system of the study process and criteria that make up them i.e. how much the criteria are higher or lower compared with other criteria were determined. For evaluating the significance of the criteria, the AHP method is used. As it is already explored in earlier research (Labanauskis et al., 2018), since the early 1980s, pairwise comparison has become the central point of the AHP and the analytic network process (ANP) introduced by T. L. Saaty along with his fundamental scale for pairwise comparison ranging from 1 to 9 (Saaty, 2008). The choice of the method is conditioned by the fact that the significance of the indicator shows the expert opinion on the importance of the indicator for choosing the best alternative from the list of the alternatives under consideration. An overview of AHP applications can be found in a number of works (for references see, e.g. Mazurek & Perzina, 2017). The advantages of the AHP method are listed in G. Poškas, P. Poškas, Sirvydas, and Šimonis (2012), and the deep analysis of the AHP method in Labanauskis et al. (2018).

The first step of systematization and analysis of the collected data using the AHP method is to perform a pairwise comparison of the criteria I_j. For this reason, E_k experts need a scale of the numbers indicating how many times one more important or dominant criterion is over another with respect to the property they are compared. Table 2 indicates the scale proposed by Satty (1980).

Table 2. The fundamental scale of absolute numbers (source: Satty, 2008)

Intensity of importance	Definition
1	Equal importance
2	Weak or slight
3	Moderate importance
4	Moderate plus
5	Strong importance
6	Strong plus
7	Very strong or demonstrated importance
8	Very, very strong
9	Extreme importance

Thus using Table 2, all E_k experts construct the tables of pairwise comparison. The criteria in the rows are compared with those in the columns. If a criterion in the row is more important than the one in the column, then, the corresponding cell is filled by the number w, which denotes the intensity of importance. In another case, the expert uses the inverse intensity of importance, i.e., $1/w$. If criteria are of equal importance, then, the cell is filled by number 1.

Every expert has made a pairwise comparison of criteria in 7 areas (thematic groups), in total 98 pairwise comparison tables were constructed. The second step is to determine the generalized weight (significance) of the criteria composing the study process at the university level. Hence, the sequence presented in (Labanauskis et al., 2018) should

be implemented. Due to the steps from Table 5 in (Labanauskis et al., 2018) pairwise comparison matrices $P_m^{(k)} = (p_{ij}^{(k)})$, where p_{ij}, $i, j = 1, ..., n$, denote the pairwise comparison of criteria I_i and I_j, were created. And after that, the consistency of pairwise comparison matrices $P_m^{(k)}$ was tested. It follows from (Labanauskis et al., 2018) that the necessary condition for the consistency of the comparison matrix is the transitivity of the significance of the elements of the matrix $P_m^{(k)}$. Inconsistent pairwise comparison matrices cannot be used for further research unless experts were asked to revise their judgments. In our research, all pairwise comparison matrices were selected for further decisions, as the consistencies were satisfied.

The second stage is to test the consistencies of expert judgments. For that, Kendall's coefficient of concordance W_m (Kendall, 1940) is used. Kendall's coefficient of concordance is calculated according to the formula

$$W_m = \frac{12Z_m}{m^2(n^3-n)}, \quad m = 1, ..., 7, \tag{1}$$

where $c_{m,j}^{(k)}$ is the rank of the j*th* criterion in the *m*th area for the *k*th expert, and

$$Z_m = \sum_{j=1}^{n}\left(\sum_{k=1}^{r} c_{m,j}^{(k)} - a^2\right)^2, \tag{2}$$

$$a = \frac{1}{n}\sum_{j=1}^{n}\sum_{k=1}^{r} c_{m,j}^{(k)}, \tag{3}$$

If the judgments of the experts are consistent $W_m = 1$, otherwise $W_m = 0$. In order to determine the significance of the concordance coefficient, the further hypothesis should be tested: H_0: the judgments of the experts are inconsistent ($W_m = 0$); H_1: the judgments of the experts are consistent ($W_m > 0$). If $n > 7$, the significance of the concordance coefficient could be determined with the help of criteria χ^2, as the random variable

$$\overline{\chi}_m^{\,2} = W_m m(n-1) = \frac{12Z_m}{mn(n+1)}, \tag{4}$$

is distributed according to χ^2 – distribution with $\nu = n-1$ degrees of freedom. The significance of the concordance coefficient W_m is performed by comparing $\overline{\chi}_m^{\,2}$ with critical values $\chi^2_{\alpha,\nu}$ from a chi-squared distribution with ν degrees of freedom and selected confidence level α. If $\chi^2_m > \chi^2_{0,05;\nu}$, then, H_0 is rejected, which means that the dependence between the judgments of the experts exists. Let's note, that if $3 < n \le 7$, then, the distribution of χ^2 must be applied choicely, as in the case where $\overline{\chi}_m^{\,2} \le \overline{\chi}^2_{\alpha,\nu}$, the judgments of the experts may be consistent. In this instance, critical values $S_{\alpha,n}$ from the table of those of Kendall's coefficient of concordance (Friedman, 1940) are compared with Z_m values. If $Z_m > S_{\alpha,n}$, then, H_0 is rejected. The values of Z_m, W_m, χ^2_m are calculated in every area D_m (see Table 3). Also, critical values $\chi^2_{\alpha,\nu}$ with $\nu = n-1$ degrees of freedom and $S_{\alpha,n}$ with confidence level $\alpha = 0.05$ are selected.

Table 3. The consistency of expert judgments (source: personal elaboration and Friedman, 1940)

	D_1, $n = 4$	D_2, $n = 5$	D_3, $n = 5$	D_4, $n = 5$	D_5, $n = 3$	D_6, $n = 3$	D_7, $n = 5$
W_m	34	53	58	25	73	25	27
χ^2_m	14.23	29.89	32.74	14.00	20.57	7.00	15.37
$\chi^2_{\alpha,\nu}$	7.82	9.49	9.49	9.49	5.99	5.99	9.49
Z_m	332	1046	1146	490	288	98	538
$S_{\alpha,n}$	101.70	183.70	183.70	183.70	48.10	48.10	183.70

Let us note, that all areas take $\chi_m^2 > \chi_{0,05;\nu}^2$, and thus H_0 is rejected in all areas and there is no reason to discredit the consistencies of expert judgments. The same conclusion follows if we use critical values $S_{\alpha,n}$ from the table presenting the critical values of Kendall's coefficient of concordance as in all cases $Z_m > S_{0.05,\,n}$.

Since expert judgments E_k, k = 1, ..., 14 are consistent, the significance of criterion I_j, j = 1,…, 30 could be tested. Table 4 shows the results of the weights

$$b_{ij}^{(k)} = \frac{p_{ij}^{(k)}}{\sum_{i=1}^{n} p_{ij}^{(k)}}, \tag{5}$$

of the jth criterion assigned by the kth expert E_k in separate areas D_m, m = 1, ..., 7. In addition, general weights

$$\overline{q}_{m,i} = \frac{1}{n}\sum_{k=1}^{r} q_{m,i}^{(k)}, \qquad i = \overline{1,n}, \tag{6}$$

and ranks ($\overline{c}_{m,i}$) are listed (also see Figure 3). Let us note, that the ranking is a procedure when the highest rank equal to 1 is devoted to the most important criterion (with the highest weight). The second rank is devoted next to the most important criterion, etc.

Table 4. The weights and ranks of criteria (source: compiled by authors)

	E_k / I_j	E_1	E_2	E_3	E_4	E_5	E_6	E_7	E_8	E_9	E_{10}	E_{11}	E_{12}	E_{13}	E_{14}	$\overline{q}_{m,i}$	$\overline{c}_{m,i}$
D_1	I_1	0.20	0.11	0.13	0.23	0.05	0.50	0.17	0.26	0.55	0.05	0.60	0.51	0.27	0.55	0.30	2
	I_2	0.66	0.62	0.46	0.63	0.57	0.26	0.44	0.06	0.26	0.65	0.10	0.29	0.13	0.28	0.39	1
	I_3	0.09	0.05	0.19	0.10	0.24	0.08	0.08	0.12	0.14	0.11	0.24	0.16	0.07	0.12	0.13	4
	I_4	0.05	0.22	0.22	0.04	0.14	0.16	0.31	0.56	0.05	0.18	0.05	0.04	0.53	0.05	0.19	3
D_2	I_5	0.59	0.29	0.53	0.43	0.50	0.24	0.43	0.42	0.47	0.54	0.47	0.46	0.45	0.46	0.45	1
	I_6	0.07	0.04	0.07	0.07	0.16	0.10	0.18	0.10	0.29	0.12	0.27	0.07	0.26	0.29	0.15	4
	I_7	0.04	0.06	0.03	0.04	0.03	0.04	0.15	0.21	0.13	0.06	0.07	0.03	0.03	0.15	0.08	5
	I_8	0.11	0.15	0.26	0.34	0.25	0.51	0.07	0.23	0.07	0.04	0.15	0.25	0.16	0.06	0.19	3
	I_9	0.19	0.46	0.10	0.12	0.06	0.12	0.17	0.05	0.04	0.23	0.04	0.20	1.00	0.04	0.20	2
D_3	I_{10}	0.48	0.44	0.45	0.45	0.51	0.48	0.45	0.15	0.48	0.45	0.48	0.48	0.45	0.40	0.44	1
	I_{11}	0.11	0.13	0.16	0.07	0.13	0.07	0.15	0.26	0.25	0.05	0.07	0.03	0.27	0.18	0.14	4
	I_{12}	0.32	0.09	0.26	0.30	0.08	0.26	0.04	0.44	0.15	0.16	0.11	0.06	0.17	0.29	0.19	2
	I_{13}	0.06	0.31	0.10	0.14	0.26	0.16	0.30	0.05	0.08	0.10	0.31	0.26	0.08	0.10	0.16	3
	I_{14}	0.03	0.03	0.03	0.04	0.03	0.04	0.07	0.09	0.03	0.24	0.04	0.17	0.03	0.03	0.07	5
D_4	I_{15}	0.07	0.03	0.08	0.12	0.03	0.13	0.20	0.15	0.48	0.47	0.21	0.46	0.06	0.20	0.19	2
	I_{16}	0.47	0.16	0.04	0.04	0.08	0.04	0.04	0.05	0.28	0.26	0.07	0.03	0.12	0.36	0.15	4
	I_{17}	0.25	0.26	0.26	0.57	0.50	0.44	0.52	0.26	0.15	0.16	0.53	0.26	0.52	0.25	0.35	1
	I_{18}	0.17	0.49	0.47	0.07	0.26	0.07	0.16	0.09	0.06	0.08	0.14	0.07	0.26	0.14	0.18	3
	I_{19}	0.04	0.06	0.15	0.20	0.12	0.32	0.08	0.44	0.03	0.04	0.04	0.17	0.04	0.05	0.13	5
D_5	I_{20}	0.20	0.07	0.18	0.18	0.06	0.28	0.22	0.26	0.63	0.27	0.29	0.27	0.19	0.54	0.26	2
	I_{21}	0.74	0.78	0.75	0.75	0.65	0.63	0.69	0.63	0.26	0.67	0.65	0.67	0.72	0.30	0.63	1
	I_{22}	0.06	0.15	0.07	0.07	0.29	0.09	0.09	0.11	0.11	0.06	0.06	0.06	0.08	0.16	0.11	3
D_6	I_{23}	0.07	0.23	0.19	0.27	0.28	0.25	0.55	0.30	0.63	0.06	0.15	0.26	0.06	0.67	0.29	2
	I_{24}	0.64	0.08	0.72	0.67	0.64	0.68	0.37	0.54	0.26	0.27	0.78	0.63	0.27	0.27	0.49	1
	I_{25}	0.28	0.69	0.08	0.06	0.07	0.07	0.07	0.16	0.11	0.67	0.07	0.11	0.67	0.06	0.23	3
D_7	I_{26}	0.05	0.06	0.14	0.23	0.07	0.12	0.06	0.15	0.34	0.44	0.23	0.43	0.43	0.45	0.23	2
	I_{27}	0.22	0.03	0.04	0.11	0.04	0.03	0.03	0.09	0.22	0.08	0.56	0.25	0.29	0.24	0.16	4
	I_{28}	0.51	0.23	0.26	0.56	0.51	0.51	0.27	0.44	0.26	0.29	0.12	0.17	0.07	0.16	0.31	1
	I_{29}	0.08	0.12	0.07	0.07	0.14	0.07	0.15	0.05	0.06	0.04	0.03	0.11	0.03	0.10	0.08	5
	I_{30}	0.15	0.56	0.49	0.04	0.23	0.27	0.49	0.26	0.11	0.16	0.07	0.04	0.17	0.06	0.22	3

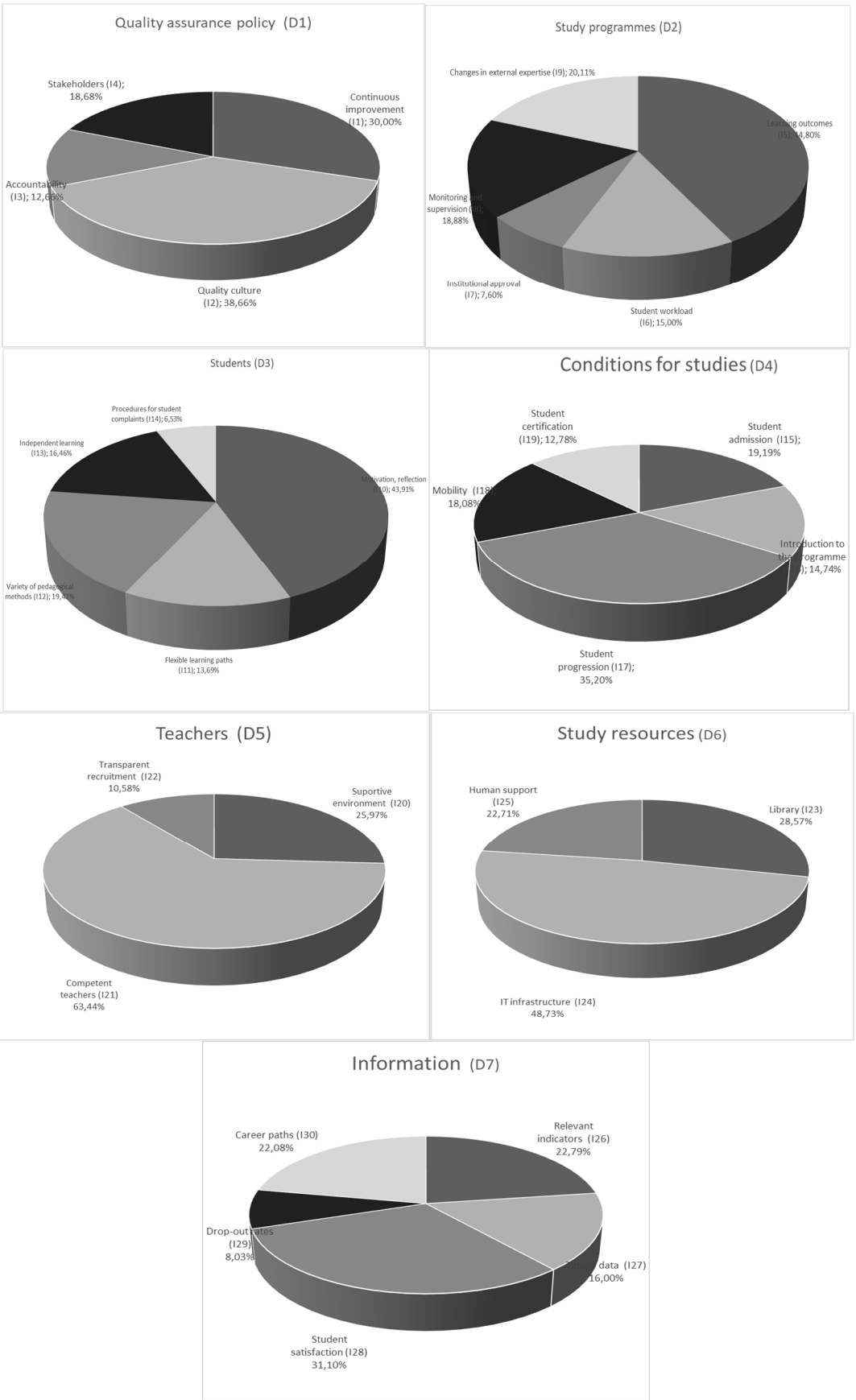

Figure 3. The weights of criteria (source: compiled by the authors)

Table 4 and Figure 3 revealed that, the most significant criteria in areas D_m are I_2, I_5, I_{10}, I_{17}, I_{21}, I_{24}, I_{28} accordingly.

Furthermore, in area D_3 the judgments of experts considering the most important criterion I_{10} are almost the same. Only one expert decided that in the corresponding area the most important criteria must be I_{12}. The weight of I_{10} in D_3 is 43.91% of the total weights of criteria I_{10}, I_{11}, I_{12}, I_{13}, I_{14}. As for areas D_2, D_5, according to the most significant criteria, only 2 opinions are different. In area D_2, the judgments decided that the most significant criteria are I_5. Also, two experts decided that the most important criteria must be I_8 or I_9. The weight of I_5 in D_2 is 44.8% of the total weights of other criteria. As for area D_5, the judgments of all experts considering the most important criterion I_{21} are almost the same. Two experts decided that in the corresponding area the most important criteria must be I_{20}. The weight of I_{21} in D_5 is 63.44% of the total weights of criteria I_{20}, I_{21}, I_{22}. In the rest of the areas, according to the most significant criteria, there are more than 3 different opinions. The weights of the most significant criteria in the above-mentioned areas are not less than 48.73% of the total weights of the criteria in the respective areas. Let us note that criteria I_3, I_7, I_{14}, I_{19}, I_{22}, I_{25}, I_{29} were of the lowest importance by experts' opinions.

Conclusions

One of the essential activity of the university is the academic study process. Being very detailed origin that is very similar to implementation in different universities but only at first glance. The relevance up to the date of the topic to analyze the quality of the university study process has been confirmed by research papers analysis. The university-level academic studies are a permanent and dynamic process but of complex origin confirmed by teardown analysis of ESG provisions. Comprises a wide range of subjects and criteria with difficult to measure quantitatively for some of them. However, the ESG guidelines have provided an opportunity to rearrange the university level study process in a systematic way for further assessment.

The present study used a multi-criteria decision-making AHP method as a tool for evaluating the significance of the criteria that compose the university study process. The questionnaire based on the AHP methodology was made. The strictly selected experts from three different universities have participated in this research.

The research results have demonstrated the importance and weights of the criteria composing different areas of the university level study process. The findings have disclosed that criteria that are the most important in striving to achieve the highest quality of the study process at the university level. According to the experts' opinions the following criteria as the quality culture, learning outcomes, student motivation, and reflection, student progression, competent teachers, IT infrastructure, student satisfaction are seen as most significant for university-level study process performance. It also should be noted that some of these criteria are difficult to measure quantitatively. The composition of these criteria based on appropriate indicators could become a score-card for university decision makers while managing the university study process. The rest of the criteria also should not be forgotten as the elements of the complex and diverse process.

The research did not reveal the significant differences between the opinions of Lithuanian and foreign experts on this research subject.

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