# Analysis of Influence of the Quality of Specialist Training on Social and Economic Development

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## Abstract

*The article analyzes the influence of the quality of specialist training on social and economic development, both at the local and at the national level. Based on the growth pole theory and chain method of substitutions, the interdependence between qualitative indicators of specialist training and quantitative indicators of social and economic development has been investigated. The hypothesis of existence of dependence "quality of specialist training – labor market indicators – GDP" has been proved.*
*A competency-based approach is used to assess the quality of specialist training. Based on the survey carried out among the graduates who studied by master's degree programme "Management of Organizations and Administration", the quality of the specialist training is determined by assessing the importance of their competency in employment and professional activities. The economic and mathematical model is developed and the dependence between the indicators of social and economic development and the quality of specialist training is established. It is proved that the quality of specialist training should be the basis of social and economic development both at the local and at the national level.*

***Keywords:*** *quality of specialists training; competency; labor market; GDP.*

## 1. Introduction

Obtaining knowledge is the main step to success. This concerns any field of activity. High-quality education is a start element for the social and economic development of the territory, both at the local level and at the level of the whole country (Aghion, P. et al., 2009; Kostyuchenko, N. et al., 2015; Kobzev Kotásková, S. et al., 2018; Telizhenko, O. et al., 2019; Bilan, Y. et al., 2019). It is known that the generally accepted indicator of a country's development is GDP. Therefore, the purpose of this study is to determine the interdependencies that determine the growth of the GDP indicator due to the growth of the quality indicators of specialist training.

This study is based on the use of growth pole theory (Solow, R. M., 1956) with applying chain method of substitutions and other methods of economic analysis (Kim, J. O., & Mueller, C. W.,1978; Bilan, Y. et al., 2019). Each stage of the chain of this study is connected with the analysis of qualitative and quantitative indicators characterizing social and economic situation from the micro level (quality indicators of specialists training) to the macro level (GDP indicators). At the same time, the assessment of indicators of each next stage is caused by the influence of indicators of the previous stage.

In the study, the basic point of social and economic growth is the quality of specialist training at the education institutions, which corresponds to the main provisions for quality assurance standard in the European Higher Education Area (European Association for Quality Assurance in Higher Education (ENQA), 2015).

Issues of education quality management were investigated in the works of such scientists as Brookes, M., & Becket, N., 2007; Kanji, G. K. et al., 1999; Sallis, E., 2014; Wani, I. A., & Mehraj, H. K., 2014.

According to the Law of Ukraine "On Education" (2017), the quality of education is "the compliance of learning outcomes with the requirements established by law, corresponding to the standard of education and/or the contract for the provision of educational services".

## 2. Literature review

To assess the quality of specialist training, education institutions apply the competency-based approach, which is key one in the European education area.

Bierne, J. et al., (2017, May) consider the competency-based approach in terms of the influence of learning methods on the development of students' competency. They discover the relationship between learning methods, learning outcomes and competency.

A historical review of the implementation of competency-based learning is conducted by Butova, Y. (2015). The scientist studies the stages of formation and characteristics of the competency-based approach, starting with the use of the competency-based approach in linguistic education and integration into other areas of education.

Kunanbayeva S. S. (2016) considers specific features of the implementation of competency-based approach into higher education system as one of the methodological foundations of the education modernization (case study of Kazakhstan).

Mekovec, R., Aničić, K. P., & Arbanas, K. (2018) study the

use of competency-based approach for students of the specialty "Information and communication technologies". The learning environment is considered on the basis of the principle of problem-based learning and is aimed at obtaining general competencies.

Velde, C. (1999) puts the emphasis on the specific features of lifelong learning. It shows the role of a competency-based approach to learning in the context of rapid changes in the external environment.

Zaytseva, T. (2016) considers that the essence of the competency-based approach consists in the fact that education should provide "not isolated knowledge and skills" but the students' ability and readiness for professional activities in various conditions of institutional environments. The transition from principle "to form knowledge and skills" to the principle "to form professional competence" should be held through competency-based approach.

Competency and learning outcomes are the starting point in the assessment of training by certain education programmes. According to the Law of Ukraine "On Higher Education" (2014), a competency is considered as a "dynamic combination of knowledge, skills and practical skills, ways of thinking, professional, worldview and civic qualities, moral and ethical values, which determine a person's ability to successfully carry out professional and further educational activities and is the result of training at a certain level of higher education"; learning outcomes are interpreted as – "a set of knowledge, skills, other competencies acquired by a person in the process of learning according to a certain educational and professional, educational and scientific programme that can be identified, quantified and

measured".

The ideal situation is when the expected learning outcomes of the educational programme of an education institution (developed by teachers) coincide with the vision of employers in relation to the competencies that employees of companies must have, as well as the desired competencies for students.

The quality of training will depend on the correlation between the following elements of education and assessment, namely: learning outcomes – learning methods – assessment methods. Learning outcomes determine learning methods, and assessment methods are formed in accordance with them. It is clear that for different educational programmes not only learning outcomes will be different but also learning and assessment methods.

The quality of specialist training by education institutions also depends on the degree of harmonization of education programmes with the external environment. The main task for education institutions in this case is the constant monitoring and improvement of educational programmes to meet the labor market with highly qualified specialists.

**Hypothesis 1:** The quality of specialist training is the basis of social and economic development.

## 3. Method

According to the hypothesis of the study, based on the growth poles theory, the result of the quality of specialist training is the growth of GDP. There are four stages in such study chain and they are shown in Figure 1.



*Figure 1*. Stages of the chain of the influence of quality of specialist training on the social and economic development
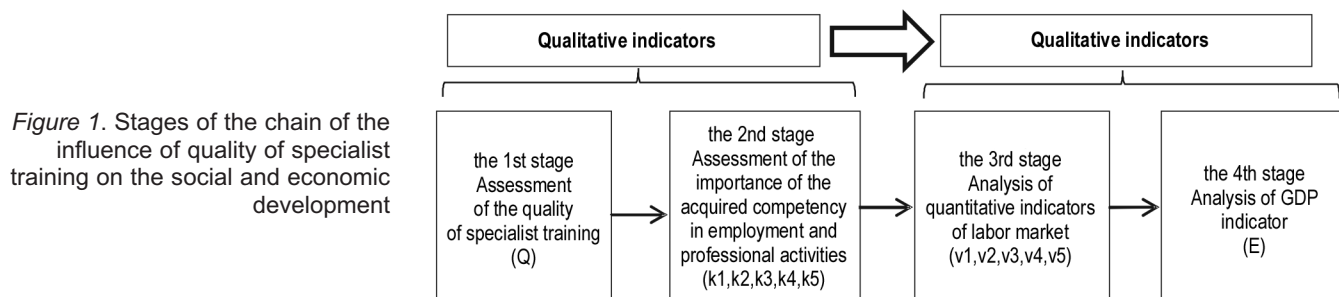
A group of qualitative and quantitative indicators has been suggested for each stage. Let's consider them.

The 1st stage. The assessment of the quality of specialist training is carried out by teachers on the basis of scoring (Q) by all courses (n) within the framework of educational programmes at education institution. In Ukraine, knowledge assessment is carried out by a 100-point scale with subsequent transfer into a 5-point scale. This corresponds to the assessment of knowledge in European countries under the Bologna Declaration. A quantitative assessment of the quality of specialists training can be represented as an average score (Q aver) that a student receives for the entire period of study.

The 2nd stage. Qualitative assessment carried out by graduates on the importance of the competencies obtained during training in employment and professional activities. The set of competencies (professional and theoretical k1, professional and practical k2, information and communication k3, teamwork k4, leadership k5) for graduates of higher education institutions are constantly expanding today as labor market dictates new ones. At the same time, many competencies are of a general nature, inherent in any specialty and without which successful employment and career growth are impossible. Professional competencies should mainly be determined by employers, and universities should teach students the latest technologies, disseminate the world experience of the scientific community in technical innovations, information software products, etc.

The employer can assess if young specialist is trained enough to work in this company, enterprise, institution and if he

can fulfill his professional duties. Quantitative assessment in this case will be subjective that is why only qualitative analysis is used.

The 3rd stage. The analysis of quantitative indicators of the labor market is carried out on the basis of a statistical analysis of the components of the labor market. In this study, based on statistical reporting, we use the following indicators:

❑ number of employed population aged 15 to 70 (*v1*);
❑ number of business entities (enterprises and individual entrepreneurs) (*v2*);
❑ number of students of higher education institutions (universities, colleges and lyceums) (*v3*);
❑ number of specialists graduated from higher education institutions (*v4*);
❑ number of persons admitted to higher education institutions (*v5*).

The 4th stage. Conducting a quantitative analysis of GDP (E) based on statistical reporting.

The dependence of each next stage on the previous one gives reasons to consider the change in GDP (E) as a function of the quality of specialist training (Q). Formula 1 is an economic and mathematical model of the dependence of GDP on the quality of training.

$$\begin{cases} E = f(v1, v2, v3, v4, v5) \\ v1, v2 = f(v3, v4, v5) \\ v4 = f(k1, k2, k3, k4, k5) \\ k1, k2, k3, k4, k5 = f(Q) \end{cases} \quad (1)$$

E – GDP,  *v1* – number of employed population aged 15 to

70, *v2* – number of business entities, *v3* – number of students of higher education institutions, *v4* – number of specialists graduated from higher education institutions, *v5* – number of persons admitted to higher education institutions, *k1* – professional and theoretical competencies, *k2* – professional and practical competencies, *k3* – information and communication competencies, *k4* – teamwork competencies , k5 – leadership competencies, Q – quality of specialist training.

According to Figure 1 and Formula 1, a correlation and regression analysis between GDP and the components of the labor market structure was conducted. The use of correlation and regression analysis for building models of economic development was carried out by the authors (Ezekiel, M., & Fox, K. A., 1959; Montgomery, D. C. et al, 2012, Zakharkina, L. et al., 2018). The dependence between GDP trends and labor market indicators at the macro level was established. We believe that trends at the macro level are inherent in the trends at the micro level. This was confirmed by the dynamics of the decrease in the number of students in education institutions both at the national level and at the level of a particular educational programme. The survey was carried out among the graduates who studied by master's degree programme "Management of Organizations and Administration" of Sumy State University (SSU). We used the interviewing method for this purpose. The survey method, that was used in the works of authors (Wywiał, J., & Żądło, T., 2009; Abdiraiymova, G. et al, 2014; Pfeffer, F. 2012; Panigrahi, S. K., & Al-Nashash, H. M., 2019) was adapted to our study. The purpose of the survey is to determine to what extend the graduates' expectations about the prospects for using the acquired competencies for employment in the chosen specialty are met. It is the growth of employment indicators based on acquired competencies that confirms the quality of training. Figure 2 shows the algorithm for conducting study.
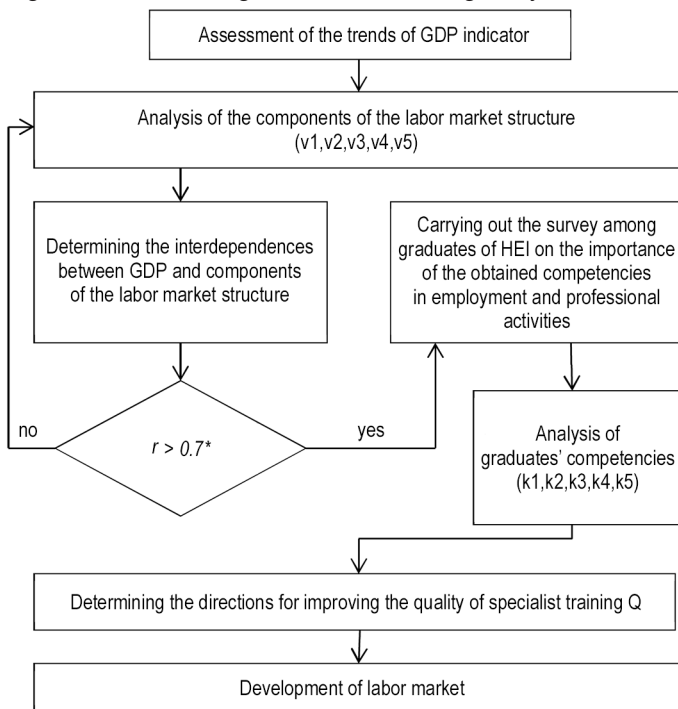


*Note: * )the Chaddok scale for assessment of stochastic relationships was used to estimate the tightness of relationships between the variables According to this scale: if r ≥ 0.7 – the relationship is tight*

*Figure 2.* Algorithm for conducting study

## 4. Results

The statistical data of Ukraine over the period 2011-2017 were used to determine the trends of GDP indicator and analyze the components of labor market structure. The values are given in Table 1.

| Year | GDP, (mln USD) E | Employed population (thous. persons) v1 | Number of business entities (including individual entrepreneurs) *(units)* v2 | Number of students at education institutions (thous. persons) v3 | Specialists graduated from education institutions, (thous. persons) v4 | Admitted to education institutions (thous. persons) v5 |
|---|---|---|---|---|---|---|
| 2011 | 163160 | 20324.2 | 1701797 | 2721.0 | 866.6 | 661.3 |
| 2012 | 175781 | 19 261.4 | 1600304 | 2593.4 | 815 | 682.9 |
| 2013 | 183310 | 19 314.2 | 1722251 | 2443.9 | 803.6 | 667.1 |
| 2014 | 131805 | 18 073.3 | 1932325 | 2004.9 | 666.5 | 539.1 |
| 2015 | 90615 | 16 443.2 | 1974439 | 1909.4 | 612.4 | 499.7 |
| 2016 | 93270 | 16 276.9 | 1865631 | 1872.5 | 539.5 | 471.7 |
| 2017 | 112154 | 16156.4 | 1805144 | 1808 | 562.4 | 470.4 |

*Table 1.* Trends of GDP indicator and components of structure of labor market of Ukraine over the period 2011-2017

*Source*: Compiled by authors based on the data of State Statistics Service of Ukraine

The results were obtained based on the correlation and regression analysis (Table 2).

| Studied dependence Y=f(X) | Results of correlation and regression analysis | | |
|---|---|---|---|
| | Equations of pair linear regression | Linear correlation coefficient, r | Coefficient of determination, r$^2$ |
| E=f(v1) | E= -237290+ 20,7v1 | 0.91 | 0.83 |
| E=f(v2) | E=564565-0,2v2 | 0.82 | 0.67 |
| E=f(v3) | E= -62887+ 90,5v3 | 0.88 | 0.78 |
| E=f(v4) | E= -51212+268,9v4 | 0.91 | 0.84 |
| E=f(v5) | E= -82874+ 383,3v5 | 0.95 | 0.91 |
| V1=f(v4) | V1=9164+12,6v4 | 0.98 | 0.96 |
| V2=f(v4) | V2= 2318635 -745,6v4 | 0.73 | 0.54 |
| E=f(v1, v2, v3, v4,v5) | E=128739.5+0.1v1-0.1v2- -163v3+110v4+351v5 | 0.99 | 0.99 |

*Table 2.* Results of the assessment of the interdependence between GDP and the components of structure of labor market of Ukraine over the period 2011-2017

The results of the analysis indicate the presence of a correlation relationship between the studied components. The correlation coefficient r is greater than 0.70 and are as close as possible to 1. This indicates that during the studied period there was a high degree of direct linear relationship between the studied components of the labor market structure and GDP. The coefficient of determination shows that the variation Y is caused by the variation X by 54-99% for the studied components. In case of an increase of graduates of education institutions in the number by 1%, an increase in employment is expected by 0.07% and GDP growth by 0.015% respectively.

Thus, GDP growth is connected with the development of the labor market. And in turn, the development of the labor market is influenced by the number of university graduates and the quality of their professional education that is reflected by the competencies acquired by them.

At the same time, during the study period, there is a general trend towards a decrease in the number of students both in Ukraine and universities in particular. As an example, let's analyze the quality characteristics of master's degree students in full-time form of training by programme "Management of Organizations and Administration" at Sumy State University. During the period 2011-2017 the graduates of the Department of Management amounted to 101 master's degree students (68 females and 33 males), including foreign students – 14 persons. The total average score of students over the period of seven years is 4.26 by a 5-point scale of assessing students' know-

| Year | Number of students | Number of foreign students in a group | Nationality | Age (year of birth) | Academic performance (average score) by 5-point scale |
|------|------|------|------|------|------|
| 2011 | 23 | 1 | 1-Tanzania | 1976-1989 | 4.12 |
| 2012 | 18 | 1 | 1-Iraq | 1981-1991 | 4.0 |
| 2013 | 15 | - | Ukraine | 1990-1991 | 4.18 |
| 2014 | 15 | 7 | 5-Turkmenistan 2- Nigeria | 1984-1993 | 4.25 |
| 2015 | 9 | 3 | 2-Nigeria 1-Russia | 1988-1993 | 4.46 |
| 2016 | 7 | 1 | 1-Zambia | 1991-1994 | 4.39 |
| 2017 | 14 | 1 | 1-Nigeria | 1992-1996 | 4.4 |

*Table 3.*
Ethnicity, age, average score over the period 2011-2017 of students, who studied by master's degree programme "Management of Organizations and Administration" of the Department of Management of Sumy State University

ledge. The total average age of a student studying by master's degree programme is 25.8 years.

Also, an analysis of graduate employment was conducted annually. The areas of employment of SSU graduates, who studied by master's degree programme "Management of Organizations and Administration" from 2011 to 2017in full-time form of training, were analyzed. The average employment rate by type of economic activity was determined (in percent) on the basis of the analysis. This indicator is shown in Table 4 compared with the employed population by economic activity in Sumy region and Ukraine in 2017. Such analysis allowed to determine the trends in the labor market and the demand for SSU graduates.

Figure 3 is based on the data of Table 4 and reflects the coincidence of employment trends by type of economic activity in Ukraine and Sumy region with the trends of employment of graduates who studied by master's degree programme "Management of Organizations and Administration" at SSU. The results of the analysis indicate the presence of a correlation relationship between studied components. The correlation coefficients $r = 0.62$. This indicates that during the studied period there was a moderate degree of direct linear relationship between the employment of SSU graduates and the employed population in Ukraine as a whole and in the Sumy region in particular. The coefficient of determination shows that the variation Y is due to the variation X by 38% by the studied components. Thus, specialist training by master's programme "Management of Organizations and Administration" corresponds to the trends of the labor market in Ukraine and Sumy region.

| Employment by type of economic activity | Employment of SSU graduates who studied by master's degree programme "Management of Organizations and Administration" %, (Y) | Employed population by types of economic activity | |
|------|------|------|------|
| | | in Sumy region in 2017, %, (x1) | in Ukraine in 2017, %, (x2) |
| Persons who continue their studying (postgraduate studies at SSU) | 16 | 1.4 | 2.6 |
| Private business (individual entrepreneurs) | 17 | 12.5 | 14.4 |
| Public administration authorities (administration, tax agency, department of statistics department of land management, etc.) | 16 | 6.0 | 6.1 |
| Trading sphere | 13 | 20.1 | 21 |
| Other, incl. | 38 | 60.1 | 55.9 |
| -industrial enterprises | 13 | 14.7 | 15.1 |
| -banking sphere | 4 | 0.7 | 1.3 |
| -advertising and publishing activity, hotel and tourism business, agriculture, etc. | 21 | 44.6 | 39.5 |

*Table 4.* Priority areas of demand in the labor market for SSU graduates who studied by master's degree programme "Management of Organizations and Administration"

*Source*: Compiled by authors based on the results of carried out survey among graduates of SSU, who studied by master's degree programme "Management of Organizations and Administration" and data of State Statistics Service of Ukraine
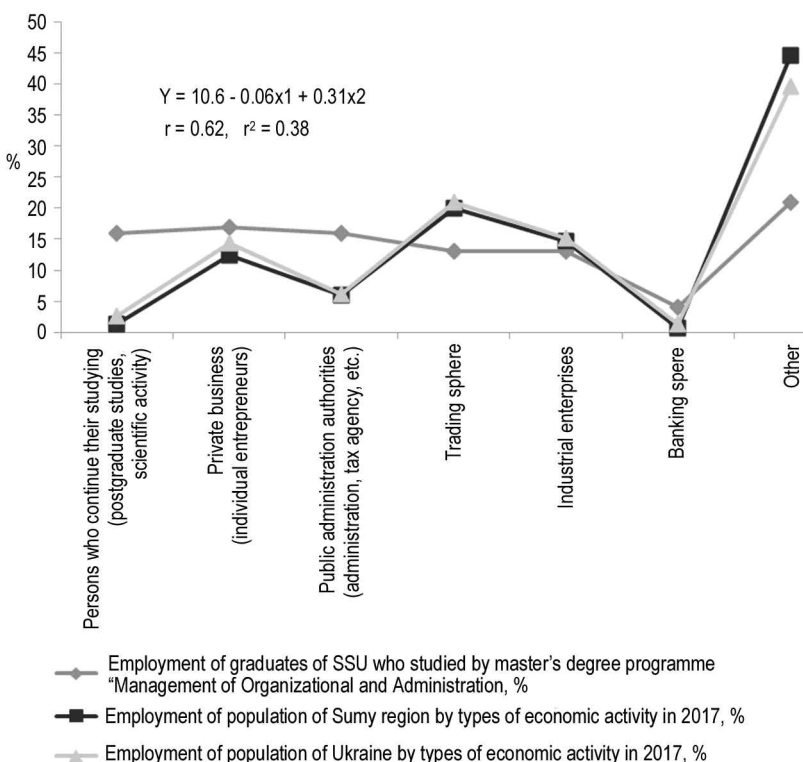


$$Y = 10.6 - 0.06x1 + 0.31x2$$
$$r = 0.62, \quad r^2 = 0.38$$

Employment of graduates of SSU who studied by master's degree programme "Management of Organizational and Administration, %

Employment of population of Sumy region by types of economic activity in 2017, %

Employment of population of Ukraine by types of economic activity in 2017, %

*Figure 3.*
Comparison of employment trends by types of economic activity in Ukraine and Sumy region with tends of employment of graduates who studied by master's degree programme "Management of Organizations and Administration" at SSU

In accordance with the areas of employment that were defined by the labor market for graduates of SSU who studied by master's degree programme "Management of Organizations and Administration" there is the necessity of analysis of competencies, the demand for which is the greatest during the studied period. For this purpose, in this study 5 groups of competencies were identified in accordance with the stated ones in the Draft of the Standard for Higher Education of Ukraine in the field of knowledge 073 Management for Level Two (Master) of higher education(2017) (table 5).

| Group of competencies | General and Special (Professional)competencies |
|---|---|
| Professional and theoretical (k1) | General competencies: Ability to conduct research at the appropriate level<br>Professional competencies: Ability to choose and use concepts, methods and tools of management, including in accordance with international standards<br>Ability for self-development, lifelong learning and effective self-management<br>The ability to plan and conduct research, prepare the results of scientific works for the publication |
| Professional and practical (k2) | General competencies: The ability to act on the basis of ethical considerations, socially responsible and consciously<br>Professional competencies. Establishing criteria according to which the organization determines the future direction of development, develops and implements appropriate strategies and plans<br>Ability to analyze and structure the problems of the organization, make managerial decisions and ensure the conditions for their implementation;<br>Ability to manage the organization, its changes<br>Knowledge of the basic modern provisions of the fundamental sciences regarding the origin, development and structure of the organization, the ability to use them to form an worldview position. |
| Information and communication (k3) | General competencies: The ability to communicate with representatives of various professional groups and within an international context;<br>Skills of using information and communication technologies for searching, processing, analyzing information from various sources and decision making;<br>Professional competencies. Ability to create and organize effective communications in the management process |
| Teamwork (k4) | General competencies: The ability to organize and motivate people towards a common goal, to work in a team<br>Professional competencies: The ability to effectively use and develop human resources in the organization<br>Ability to develop and manage projects, take initiative and show resourcefulness;<br>Ability to use psychological technologies of work with personnel |

*Table 5.* Groups of competencies by master's degree programme "Management of Organizations and Administration"

*Source*: Compiled by authors based on the Draft of the Standard for Higher Education of Ukraine in the field of knowledge 073 Management for Level Two (Master) of higher education (2017)

A survey was conducted among graduates who studied by master's degree programme "Management of Organizations and Administration" at SSU over the period from 2011 to 2017. The purpose of the survey was to determine the importance of the competencies they obtained during training for further employment and professional activities. We sent 90 questionnaires, and received 68 back. The overwhelming number of respondents believes that the competencies, which they obtained as a result of training, have influenced their successful employment. Also, the respondents assessed the separate influence of the basic competencies that they acquired while studying by master's programme for their successful employment. Respondents were asked to rate each competency on a 5-point scale. Figure 4 presents the relationship between the importance of competency for the respondent's employment field.
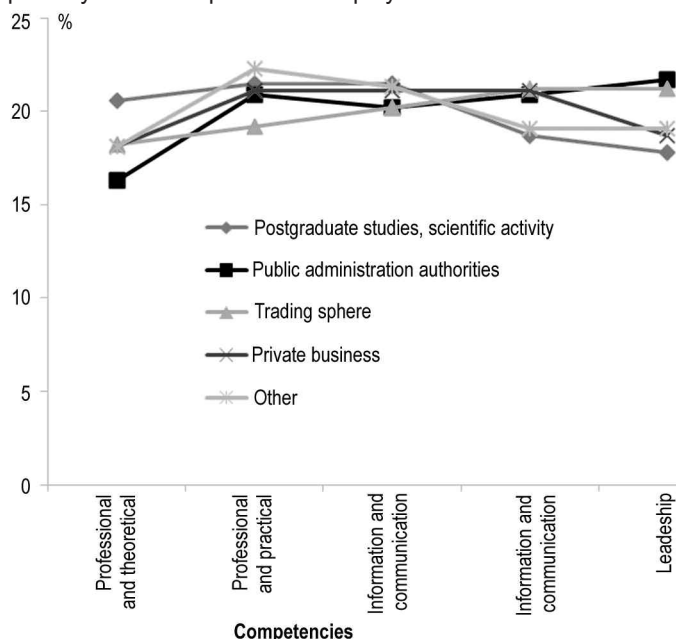


*Figure 4.* Importance of competencies for the field of respondent's employment (in percentage form).

The generalized results of the analysis are given in Table 6.

| Indicator | Competencies | | | | |
|---|---|---|---|---|---|
| | Professional and theoretical k1 | Professional and practical k2 | Information and communication k3 | teamwork k4 | leadership k5 |
| Percentage value | 18.5% | 21.1% | 21.0% | 20.1% | 19.3% |

*Table 6.* Assessment of importance of obtained competencies in employment and professional activity of graduates who studied by master's degree programme "Management of Organizations and Administration".

*Source*: Compiled by authors based on the results of carried out survey among graduates who studied by master's degree programme "Management of Organizations and Administration" at SSU during the period from 2011 to 2017

In general, the questionnaires showed almost the same importance of the acquired competences in employment. Managers can work in various fields of activity, and their strong professional characteristics should be ensured by these competences.

Also, on the basis of the obtained questionnaire data, a correlation was established between the indicator of the quality of specialist training (Q) and the assessments of respondent's assessment of obtained competencies ($k1$, $k2$, $k3$, $k4$, $k5$). Thus, a hypothesis about the dependence of the quality of specialist training on the obtained competencies was proved (formula 1). For this purpose, a regression dependence was determined (formula 2) between the average score (Q), which the respondent received as a result of training at the university and the assessment of the importance of obtained competencies for him (R = 0.71, $r^2$ = 0.51).

$$Q = 1,19 + 0,200k1 + 0,196k2 + 0,335k3 - 0,003k4 + 0,001k5 \quad (2)$$

A comparison of the results obtained in Table 6 and formula 2 proves the following. The largest component in the formation of an overall assessment of Q (formula 2) is information and communication competencies k3 (coefficient 0.335), professional and theoretical k1 (coefficient 0.200) and professional and

practical k2 (coefficient 0.196). And according to the graduates' own assessment (table 6), the most significant competencies for them were professional and practical k2 (21.1% of respondents), information and communication k3 (21.0% of respondents) and teamwork k4 (20.1% of respondents).

## 5. Conclusions

The results of the analysis show that the largest correlation relationship is observed between the number of the employed population and GDP (r = 0.91). At the same time, the number of the employed population depends on the number of graduates of education institutions (r = 0.98). Modeling the interdependencies between GDP and the components of the labor market shows that in the conditions of Ukrainian economy, there is a relationship between the number of graduates of education institutions and social and economic development that indicates the necessity to find ways for improving employment rates. This is possible due to the condition of improving the quality of specialist training by determining the competencies required for the labor market.

The main qualitative characteristic of graduates of an education institution is an indicator of demand in the labor market. The analysis of the importance of competencies for the employment of graduates who studied by master's degree programme "Management of Organizations and Administration" proved the equal importance of each of five groups of competencies. According to the opinions of graduates, professional and practical competencies became the most important ones for employment (21.1% of respondents).

In general, the results of the study indicate the possibility of growth of quantitative indicators of social and economic development (GDP, labor market indicators, etc.) due to the improvement of quality indicators of specialist training on the basis of competency-based approach. This is possible through the improvement and revision of educational programmes in terms of professional and practical training of specialists.

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