

Intellectual Capital of Institutions of Higher Education in the Knowledge Economy

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Abstract

To determine the directions of managing the intellectual capital of a university, the authors studied the impact of the knowledge economy on the education sector, analysed the most prestigious international rankings of universities and their criteria and methodologies, assessed the current state and prospects of Ukrainian universities in global rankings. The study of theoretical developments has proven the importance of the intellectual capital of the university and its ability to increase the competitive advantages of universities. Authors proposed the mechanism of institutions of higher education intellectual capital management in the knowledge economy, which provides a synergistic effect of all components of intellectual capital and will increase the competitive advantages of Ukrainian universities.

Keywords: Institution of higher education; Intellectual capital; Intellectual property; International ranking; Knowledge economy.

1. Introduction

The system of higher education in the long term is called upon to become the basis for building up and making the fullest use of the intellectual potential of the nation, and universities as drivers of the development of territories (the concept of University 4.0) (Bashynska *et al.*, 2019; Gontareva *et al.*, 2019; Tirto *et al.*, 2020). Institutions of higher education should become not only generators and translators of advanced knowledge but also ensure the reproduction of the necessary competencies, use intellectual property as a liquid asset (Bila *et al.*, 2020; Dzwigol *et al.*, 2020). Already today, the intellectual capital of universities, including knowledge, competencies, professional experience of employees, reputation indicators, customer component, etc., begins to play the most significant role in their advanced development. Obtaining additional income due to the unique competitive advantages acquired as a result of the use of intellectual assets becomes the object of attention of modern universities when determining the directions of strategic development (Titova and Shutov, 2014; Prokopenko S. and Selevich, 2016).

An adequate response to changes in the external environment, as domestic and foreign experience shows, is the formation and development of universities as subjects of market relations and their inclusion as the most critical component of the innovative sector of the

economy (Kholod *et al.*, 2020).

One of the leading modern directions of modernisation of higher education is the formation of models of research and innovative universities, which allows universities in the knowledge economy to more effectively perform their tasks. A feature of these models is their target setting to enhance the interaction between science and education. The specifics of its intellectual capital are specified depending on the development model of the university. A systematic study of the process of formation, accumulation and effective use of intellectual capital is now becoming increasingly important for the reform of domestic higher education in general.

2. Impact of The Knowledge Economy on Education

The knowledge economy significantly increases the requirements for the education system as a whole (Ponomarenko *et al.*, 2018). The knowledge that a person receives in the education system is no longer a constant value but is only a foundation that requires constant superstructure, refinement and improvement, that is, in the new knowledge economy, there is a need for constant and perpetual training, retraining and advanced training (Prokopenko O. *et al.*, 2018; Tkachenko *et al.*, 2019). Based on this, new requirements for the field of education are being formed (Fig. 1).

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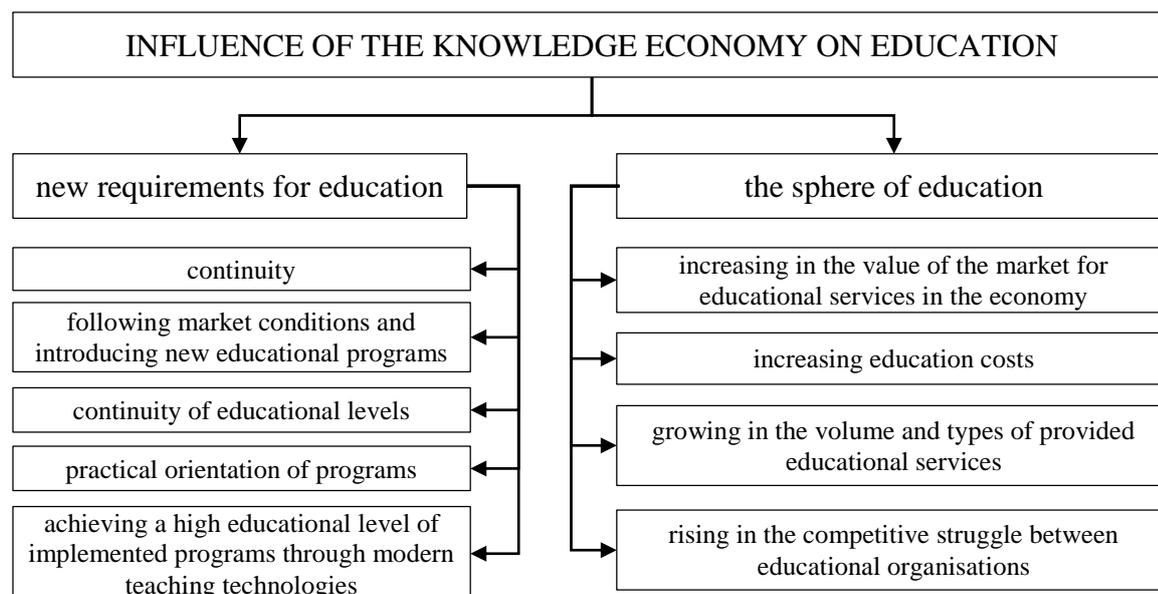


Fig 1. Requirements and areas of education in the knowledge economy

The high level of competition in the field of education determines a new strategy for participants in the educational services market – an integration strategy. The integration processes will involve both different levels of education, which form a continuous chain of educational links, and the creation of research laboratories, innovation incubators, technoparks, scientific innovation centres in the structure of educational institutions, the purpose of which will be to commercialise scientific achievements and their practical implementation (Trusova, 2016; Kisiółek et al., 2020). And in essence, education, science and production are involved in the integration process. In this regard, it is necessary to highlight the main tasks of the state in building a knowledge economy:

– organisation of the process of production and

dissemination of knowledge by increasing the efficiency of the functioning of the education and science system;

- strengthening the relationship of education with manufacturing and services;
- formation of a network of effective support for the development of innovative entrepreneurship.

Further economic development and the establishment of the knowledge economy is impossible without the creation, accumulation, large-scale application and further reproduction of knowledge, which are the basis of economic and scientific and technical changes. Thus, the efforts of the state to develop the new economy should be focused on three areas (Fig. 2).

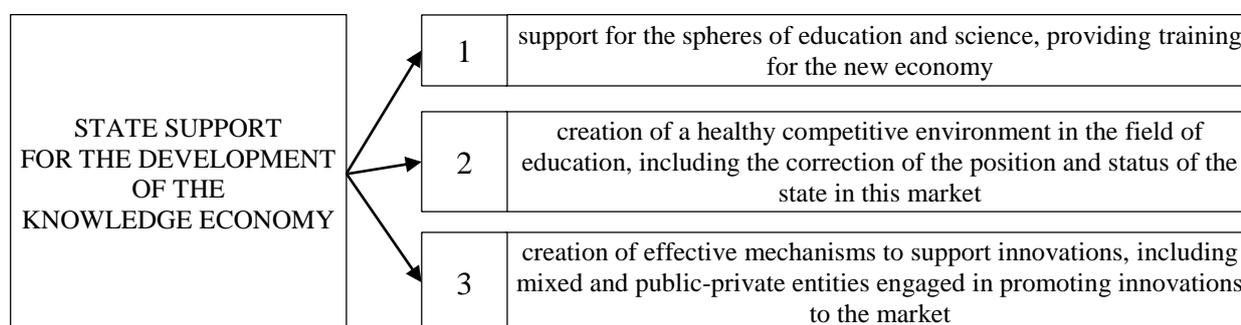


Fig. 2. Directions of state support for the development of the knowledge economy

Since the education sector is becoming a vital element of the new knowledge economy, in the future, it should become not only a source of intellectual rent but also determine the country's international competitiveness.

And in international competition, the one who will be able to be a leader not only in the production of knowledge but also in its broad and mobile dissemination through global educational systems will occupy priority positions. Thus,

in the knowledge economy, the education sector turns into an instrument for the effective creation, distribution and application of knowledge and competencies.

3. Methods and Criteria for International Assessment of Higher Education Institutions. Ukrainian Ihes in Global Rankings

There are several generally accepted world rankings:

1) *World University Rankings 2020*. The Times Higher Education 2020 World University Rankings include almost 1,400 universities in 92 countries and is the world's largest and most diverse university ranking. The table is based on 13 carefully calibrated performance indicators that measure the effectiveness of the institution in the field of training, research, knowledge transfer and worldview.

The only university ranking that is independently reviewed by PricewaterhouseCoopers and trusted by students, faculty, and education experts around the world, this year's table provides excellent information on changing the balance of power in global higher education. In the next annual ranking of the best universities in the world, there are 6 Ukrainian universities, one of which won a place in the group 810-1000, and the rest are in the category of 1000+.

2) *QS World University Rankings by Subject 2020*. Each subject rating is based on four main parameters. The first two are global surveys of scholars and employers, which are used to assess the international reputation of institutions in each subject. The other two indicators are a scientific impact assessment based on the number of scientific citations per work and an H-index (Worse Index) in the relevant subject area, calculated from the Scopus Elsevier database. However, the weight of each indicator is different for each industry: for example, the average citation and the H-index in linguistics are not taken into account at all, and in dentistry, on the contrary, they have decisive total weight. In total, 1368 universities from all over the world were evaluated in the subject rankings, among which 2 Ukrainian IHEs were included in the rating.

3) *University Impact Rankings 2020*. The ranking includes 766 universities from 85 countries (in 2019 – 450 universities from 76 countries), among which 10 Ukrainian IHEs were included in the ranking of the impact of universities on social and economic development. To form the ranking, the researchers used 17 sustainable development goals identified by the UN. Among these 17 goals, 11 were selected, which formed the basis of the indicators used in the ranking. Among them:

- health and well-being;
- quality training;
- gender equality;
- decent work and economic growth;
- responsible consumption and production.

Each indicator includes several indicators.

4) *Ranking Web of Universities* (Webometrics). The National Research Council of Spain annually publishes the international ranking of universities in the world Ranking Web of Universities (Webometrics).

The Webometrics ranking has been researching more than 25,000 universities around the world that have their web resources for more than 15 years. The main idea of the ranking is to assess the scientific, educational and social mission of universities indirectly through the indicators of the university's representation in the webspace. The rating includes 315 Ukrainian IHEs.

5) *The Academic Ranking of World Universities* (ARWU). The academic ranking of world universities is widely known under the name "Shanghai". It has been issued annually since 2003 by the staff of the World-Class University Research Center of the Shanghai Jiao Tong University Academy of Higher Education. The academic ranking of world universities is based on six indicators (Fig. 3).

Not a single Ukrainian IHE was included in the rating. Thus, analysing the Ukrainian IHEs in international rankings (Fig. 4), we can conclude that they cannot boast of weight in the world arena.

There is a national rating – "Top-200 Ukraine 2020" – research by the Center for International Projects "Euroeducation" and the International Group of Experts IREG Observatory on Academic Ranking and Excellence (Top-200 Ukraine 2020, 2020). According to their methodology, the basic principles of determining the ratings of Ukrainian universities:

- a) Ensuring full openness, transparency and independence of university rankings. For this purpose, only open data of direct measurements, displayed on free web resources of independent national and international organisations and institutions, were used. No data or expert assessments of the universities and their governing bodies were used. The method of calculating university ratings is available to the public to verify the results.
- b) Taking into account the comprehensiveness, diversity of university activities. To this end, their work was collectively evaluated on a broader base of indicators compared to known rating systems. In particular, this year's rating of Ukrainian universities was calculated according to ten indicators, six of which are international and four national indicators (Fig. 5).

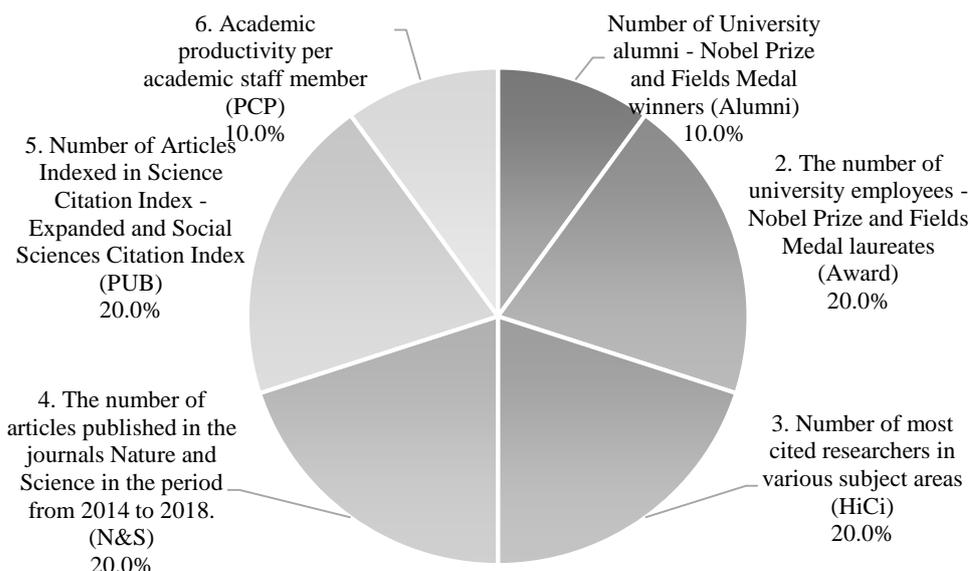


Fig. 3. Indicators for evaluating the activities of universities according to ARWU

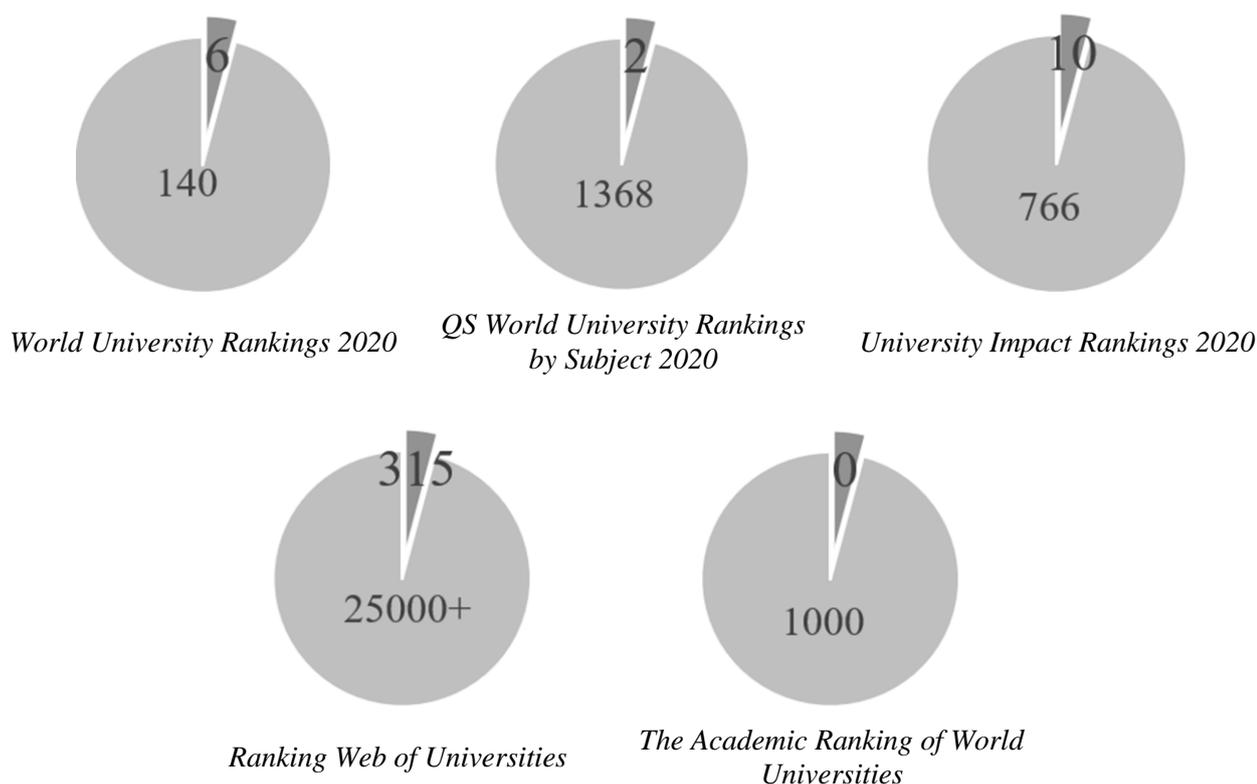


Fig. 4. Number of Ukrainian IHEs out of total universities in international rankings

c) Based on the importance of European integration processes of higher education in Ukraine, the weights of international indicators of universities (results in world rankings, the participation of universities in Erasmus + programs of the European Union) are set higher than the weights of national indicators.

Analysing the world and national rankings, we can conclude that the indicators of the ranking of universities associated with intellectual capital occupy in the assessment criteria from 40% and above, which indicates its importance. It is also worth noting that this figure will grow over the years.

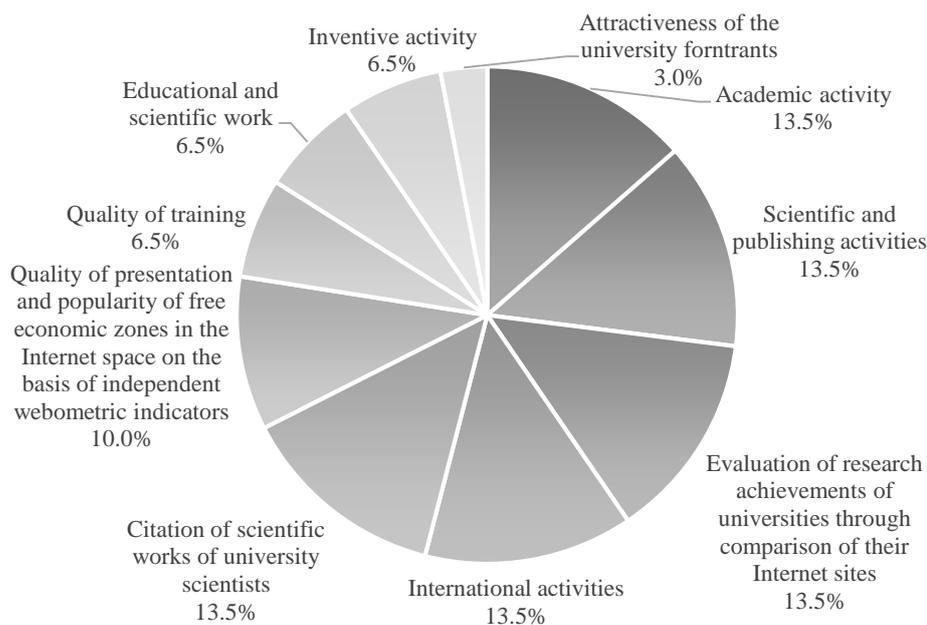


Fig. 5. Indicators for evaluating the activities of universities according to Top-200 Ukraine 2020

4. Analysis of Results

There is a tremendous amount of research related to finding the most appropriate definition for the concept of "intellectual capital", therefore, under "intellectual capital" we mean the knowledge, skills and production experience of specific people and intangible assets, including patents, databases, software, trademarks, etc. others, which are productively used to maximise profits and other economic and technical results (Stewart, 1998; Sergeev, 2016; Miśkiewicz, 2018; Khan *et al.*, 2019).

To effectively manage the intellectual capital of IHE, it is necessary to determine the goals of the organisation's development, which include: improving the quality of the educational process; increasing the target audience; consolidation of competitive positions in the labour market; increasing sources of income, etc. To achieve the set goals is necessary to determine which type of asset in the structure of intellectual capital most affects the solution of the set goal and what transaction costs are typical for this type of asset, and then develop measures to reduce them. This concept sufficiently confirms the hypothesis that intellectual capital has a significant impact on the activities of universities.

The study of theoretical developments related to the consideration of the structure of the IC allows us to conclude that all researchers identify four main components in the IC organisation: human, structural, consumer capital and intellectual property. The importance and significance of each of the four components of intellectual capital for understanding the essence of the process of creating and increasing the intellectual capital of an organisation determine the need for more detailed consideration. To extract value from the use of intellectual capital, organisations need to manage knowledge flows between capitals of various types:

Human capital – is the ability of individuals and teams to

meet customer needs, the competence and direction of thought of individuals.

Structural capital – the capabilities of an organisation that derive from the encoded knowledge contained in sources such as various knowledge bases, business processes, technological infrastructure or organisational culture, values and norms.

Intellectual property – the result of the creation of the human mind; in our context, it is the result of the activities of IHE teachers (teaching aids, publications, scientific developments, etc.).

Client capital – the strength of relationships with the client, the value transferred to the client, the growth of the client's influence in decision-making.

Intellectual capital does not grow by adding up the four listed parts of it (human, structural and consumer), but based on their interaction and the emergence of synergistic effects. In this case, there is a cross-effect of some types of assets on others. So, for example, client capital can strengthen prestige, facilitate the acquisition of new consumers. Organizational (or structural) capital with the help of knowledge transfer reduces the dependence of the organisation on the human factor. The competence of employees contributes to the development of new ideas and new projects. Consumer capital is transformed into financial capital through interaction with structural and human capital. It is essential to keep in mind that the efficiency and value of intellectual capital are dynamic categories that do not have universal properties.

Analysis of possible directions for achieving the goals of the university in the implementation of the selected business models showed the interconnection of its elements with intellectual capital; it is necessary to ensure what kind of management of the university's intellectual capital that would provide a synergistic effect of all its components (Fig. 6).

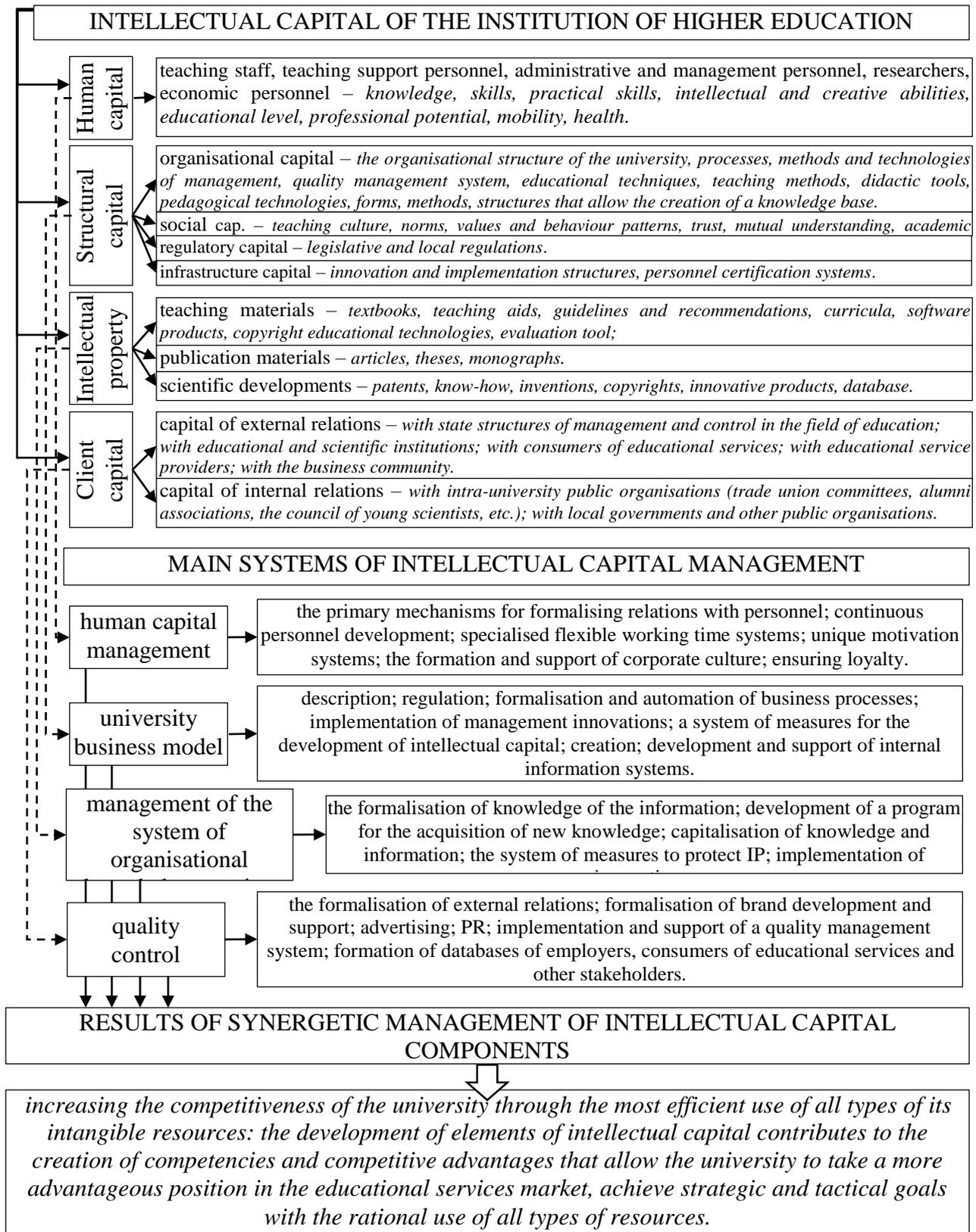


Fig. 6. Mechanism of IHEs intellectual capital management in the knowledge economy

Thus, the management of intellectual capital should become the mechanism that will increase the competitive advantages of Ukrainian IHEs.

5. Conclusions

Thus, the study shows the high importance of intellectual capital for the development of a modern university in the era of the knowledge economy, which is expressed in the following vital theses:

- universities, whose role is traditionally in the generation and transmission of knowledge, should become drivers of the growth of the intellectual capital of the territory of the location, which implies particular approaches to the formation and management of their knowledge system;
- a necessary direction of the transformation of modern universities is the formation of an innovative and intellectual environment, which is dictated by the founder and is due to a significant change of the external environment and the role of universities in society;
- research potential and activity are of the highest importance in the development of the intellectual capital of universities, which implies the formation of new knowledge and the generation of processes of their translation into all other areas of the university's activity – educational, social, educational, entrepreneurial, etc.;
- the intellectual capital of universities has a tiered structure and includes both the “public domain” – the intellectual capital of the university as a whole, and individual intellectual assets owned by employees, which determines the importance of personnel policy and academic mobility in modern conditions;
- the intellectual capital of the university is an indicator of its competitiveness. It is gradually turning into the primary source of profit, which determines the priorities in its formation, accumulation and effective use.

The proposed methodology will allow IHEs to more efficiently manage intellectual capital, which will ultimately increase its financial resources by taking significant places in the world rankings.

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