








# “Entrepreneurial universities: literature review”

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## ENTREPRENEURIAL UNIVERSITIES: LITERATURE REVIEW

### Abstract

The article is devoted to the generalization and development of the terminology that is used to describe the essence and content of the concept "entrepreneurial university".

The results of the literature review allow us to present the concept "entrepreneurial university" in the form of a system of interrelated economic terms. Based on the analysis of search queries, using the databases of Scopus and Google Scholar, the publications that reveal the content of the concept "entrepreneurial university" were selected; the features and key characteristics of the definition of this concept by various authors were defined; the authors' interpretation has been provided. The analysis of research in the field of university entrepreneurship, which currently covers 314 articles published in various scientific journals, allows us to inductively describe the dynamic process of university entrepreneurship based on the literature synthesis.

The presented definition of "entrepreneurial university" concept is based on an analysis of the evolution of ideas about the subject of the entrepreneurship theory and modern scientific management approaches and allows establishing the semantic network that reflects the inner content of the concept "entrepreneurial university".

### Keywords

entrepreneurial university, entrepreneurship, higher education, academic entrepreneurship, universities innovation networks

### JEL Classification

K20

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## ПІДПРИЄМНИЦЬКІ УНІВЕРСИТЕТИ: ОГЛЯД ЛІТЕРАТУРИ

### Анотація

Стаття присвячена розвитку, узагальненню та уточненню термінології, яка використовується для описання сутності за змісту поняття «підприємницький університет». Результати огляду і аналізу літературних джерел дозволяють представити поняття «підприємницький університет» у вигляді системи взаємопов'язаних економічних термінів. На основі проведеного аналізу пошукових запитів з використанням даних бази Scopus та Google Scholar було відібрано публікації, які розкривають зміст поняття «підприємницький університет»; встановлено особливості визначення даного поняття різними авторами та виділено ключові характеристики; встановлено основні змістовні характеристики поняття «підприємницький університет» відповідно до існуючих наукових підходів менеджмента і надано його авторське трактування. Проведений аналіз публікацій в області університетського підприємництва, який в даний час охоплює 314 статей, опублікованих в різних наукових журналах, дозволяє індуктивно описати динамічний процес університетського підприємництва на основі синтезу літератури.

Представлене визначення поняття «підприємницький університет» засноване на аналізі еволюції поглядів на предмет теорії підприємництва, базується на сучасних наукових підходах менеджмента і дозволяє встановити семантичну мережу, що відображає внутрішній зміст поняття «підприємницький університет».

### Ключові слова

підприємницький університет, підприємництво, вища освіта, академічне підприємництво, інноваційні мережі університетів

### Класифікація JEL

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## INTRODUCTION

Modern universities in the USA and EU are becoming open innovation systems by attracting venture capital in the research and development sphere, increasing patenting and licensing of research results, enhancing the scientific and teaching staff mobility, creating incubators, science parks, university departments, as well as investing in startups. This is facilitated by technological achievements in the IT-sphere, which at present contributed to the creation of scientific and educational content, sharing it online and monetizing the result.

Ukrainian HEIs have also joined the process of university entrepreneurship. This was facilitated by the adoption of the Law of Ukraine “On higher education” (2014), which declares the academic, organizational, financial, staff autonomy of HEIs. Ukrainian universities actively form a network of technology parks, start-ups, business incubators, FabLab centers with the support of European educational institutions, take an active part in increasing the teaching and staff mobility, enhance the HEIs-business cooperation to find partners for R&D financing. The declarativeness of the Law of Ukraine “On higher education” (2014) in the field of HEIs financial autonomy, as well as structural changes in higher education along the path to their transformation from the classical tasks of teaching and research to the development of entrepreneurship, attract the attention of researchers to the universities’ entrepreneurship.

Analysis of the academic literature on the creation and functioning of entrepreneurial universities is currently fragmented and unsystematic, which makes it difficult to understand the current barriers inherent in this process, as well as the formulation of recommendations for overcoming them in the regulatory, organizational and financial spheres.

### 1. AIMS

The purpose of the paper is to explore the prerequisites of formation of entrepreneurial universities in Ukraine and to identify the terminology used to describe the essence and content of the definition of “entrepreneurial university”. In this study, we used the results of a generalization of the literature on entrepreneurial universities and the European experience in their formation.

### 2. LITERATURE REVIEW

Currently, the most comprehensive and structured study is the taxonomy of the literature on University entrepreneurship by Rothaermel, Agung and Jiang (2007), which encompasses 173 articles published in a variety of academic journals between 1981 and 2005. The authors noted an increase in the number of scientific publications devoted to the entrepreneurial activities of universities from 2000 through 2005 (127 articles), which means the intensification of the process of formation and functioning of entrepreneurial universities in the United States and the EU. However, the literature review shows the significant difference in the meaning of entrepreneurial universities depending on the context, purposes, tasks, and activity area.

In the research of Clark (1998) the concept of “entrepreneurial university” was first introduced. He examined the entrepreneurial university element-wise, with the emphasis on the mission of such universities, changes in their internal organizational structure, mechanisms of interaction with major stakeholders. The financial autonomy of entrepreneurial universities was separately considered in terms of diversifying the financing of their activities, but not excluding state funding for research and development, as well as creating a new inter- and multidisciplinary educational learning environment. Clark (1998) focused on integrating the entrepreneurial culture at the university. It should be noted that the substantive characteristics of the entrepreneurial university presented by Burton Clark formed the basis of many subsequent studies.

In the study by Wissema (2009), the concept of an entrepreneurial university formed by Clark (1998) is presented as the “third-generation university” that characterizes a successful university of the future. Etzkowitz and Ranga (2010) developed this idea and proposed using hybrid organizational forms to create a balance of relationships between the entrepreneurial university, business, industry, public organizations and other stakeholders. At the same time, the organizational forms of entrepreneurial universities in the future will also change with the growth of university autonomy.

Developing the topic of entrepreneurial universities, Urbano and Guerrero (2013), in their studies, concluded that universities should stimulate the skills that are most useful for creating entrepreneurial thinking among students. Entrepreneurial thinking stimulates innovation (not only within universities but also within existing firms) so that business becomes easily susceptible to innovations and their implementation. Thus, entrepreneurship begins to play a key role in strengthening the university environment by stimulating the development of new knowledge demanded by the market.

Bronstein and Reihlen (2014) showed a difference in the interpretation of the concept of entrepreneurial university by different authors, depending on the researcher's concentration on researching, industrialization, servitization, and commercialization. Proposed archetypes, such as research driven, industry driven, service innovation driven, and knowledge commercialization driven, help to better understand how to create an entrepreneurial university or the third-generation university.

Ukrainian researchers of the prospects for reforming the educational space of Ukraine are also considering the possibility of creating entrepreneurial universities, but they focus on the possibility of commercializing university research and development without deep reforming the business environment and the labor market. Thus, national researchers are focused more on progressive administrative, managerial, expert, and design decisions and activities for the commercialization of university research and development.

### 3. RESULTS

The multiplicity of the formed definitions of the “entrepreneurial university” concept is associated with the development of socio-economic laws within the globalization of the economy and the internationalization of education. Currently, entrepreneurship processes at the university cover a widerange of issues of the autonomy of HEIs, which initiates the improvement and unification of the concepts in this field of knowledge.

It is advisable to differentiate the conceptual apparatus using the study of entrepreneurial universities into a set of partial concepts that characterize the key elements of the university's commercial activity in order to get rid of many concepts with the same essence, but with different definitions, and also to increase the correlation of basic concepts with derivative concepts. The terminological field can be considered incomplete, with the absence of interconnections between individual concepts. In other words, it is necessary to consider the direct and inverse connections of the conceptual apparatus of entrepreneurial universities, where the basic definitions of concepts will be independent variables, and their derivatives will be dependent. Thus, a certain hierarchy of the concepts used is introduced, which assumes that any concept can be a subtype of another, more universal and abstract.

For the formation of the “Entrepreneurial University” concept the articles that use this phrase in the title and keywords in the Scopus and GoogleScholar databases were selected. This sample has been cleared of duplications. The total number of reviewed papers estimated to 314. Next, the ranking of articles by citation level was made. The analysis of literature at the Scopus and GoogleScholar open-access databases has revealed several concepts with the same essence, but different definitions (Table 1). Definitions that describe the essence of the Entrepreneurial University (presented in Table 1), are the most used and cited in Ukrainian scientific and practical journals. But their variety does not allow to characterize the concept of the “Entrepreneurial University” precisely.

**Table 1.** Definitions of the Entrepreneurial University

Definitions/ conceptions	Key facets of the term	Author(s)
<ol style="list-style-type: none"> <li>1. The organization based its activities on target innovation, capable of working in conditions of risk and dynamic demand;</li> <li>2. Cost-effective organization which is involved in profitable activities and relies primarily on its capabilities;</li> <li>3. Liberal organization with flexible network construction;</li> <li>4. Organization in which the key factors are the people, groups, and their competence, where the work of people based on the balance of benefits and risks;</li> <li>5. The organization with full support in activities of employees within the framework of the organization's strategy and the maximum delegation of authorities;</li> <li>6. The consumer-oriented organization, which allows timely and flexibly react to changes in their demands.</li> </ol>	A new type of organizational structure of educational institutions	Grudzinsky (2008)
Higher education institution which can attract additional financial resources to support its activities. The University which uses innovative teaching methods, develop close cooperation with the business community and implement the research results of University scholars.	Higher Educational Institution	Engovatova (2013)
<ol style="list-style-type: none"> <li>1. The professionalization of University management and staff combined with strong executive leadership;</li> <li>2. The diversification of sources of income;</li> <li>3. The study and integration of new market methods of management with the key academic values taking into account;</li> <li>4. Closeties with business and society;</li> <li>5. The development of proactive and innovative business culture: knowledge transfer, establishment of new manufacturing companies, continuing education and networking with alumni, as well as attracting funding to the University;</li> <li>6. The integration of academic and research units through the erosion of traditional disciplinary bound aries and institutions design initiatives, the appropriate new methods of knowledge production.</li> </ol>	A new type of organizational structure of educational institutions	The Gelsenkirchen Declaration on Institutional Entrepreneurial Management and Entrepreneurial Studies in Higher Education in Europe (2004)
A modern phenomenon that represents the realization of the scientific community a new way of production based on the continuous flow of organizational and technological innovation.	A new type of organizational structure of educational institutions	Bodunkova, Chornaya (2013)
The higher education institution, which systematically making efforts to overcome the limitations in the following three areas: the knowledge generation, teaching and transformation of knowledge into practice through initiating the new activities, transformation of the internal environment and modification of the interaction with the external environment.	Higher Educational Institution	Konstantinov, Filonovich (2007)
It must demonstrate entrepreneurial behavior as an organization; the members of the University as faculty, students, employees need to be entrepreneurs; the interaction between the University and the environment should lead to the interaction between the University and the region for business development.	High Educational Institution	Ropke (1998)
A new type of organizational structure of educational institutions based on the economic autonomy that combine traditional scientific and educational (academic) model of an educational institution and providing its employees and students the opportunity to engage in innovative entrepreneurial activities, commercialize their research and development through active interaction with regional authorities, NGOs and industry.	A new type of organizational structure of educational institutions	Grechko (2011)
The distinctive competence of the entrepreneurial University simultaneously lies in scientific and managerial areas. While the classical problems of universities in the field of research and teaching are complemented by such tasks as technology transfer, postgraduate education and adaptation to the needs of the labour market.	A new type of organizational structure of educational institutions	Zaharia, Giber (2006)
It is the kind of research center, where in addition to the traditional functions of education and science there is the transfer of knowledge in the practical field of the economy and society as a whole, the embodiment of knowledge in the product or service.	Research center	Sidorova, Rumyantsev (2014)
The representative of the academic environment associated with the structures of higher education, which also conducts business and forms venture companies based on intellectual property created within academic organizations.	Research center	Samson, Gurdon (1990)
The change of model of organization and management of the University that is the transition from funding through state budget funds to multi-channel financing through independent search of sources of additional funds.	A new type of organizational structure of educational institutions	Atoyan, Kazakova, (2005)

Therefore, the authors have tried to interpret the term “entrepreneurial university” using the classifier of text documents, namely the method of k-nearest neighbours.

The action of the classifier is based on the following principles:

- the classification is built for each concept independently of each other;
- concepts in the text are determined by the list of words encountered;
- for each concept there is a characteristic vocabulary and words;
- the set of words characteristic of the content of the concept can be divided into two parts:
  - characteristic words - many words, without which it is impossible to reveal the essence of this concept. If the text does not contain a single word from this set, then the document does not relate to the subject under study;
  - other words specific to the definition of the conceptual apparatus of entrepreneurial universities. The presence or absence of these words in the text being studied does not determine whether the document is related to the topic being studied;
  - in addition to characteristic words, the classifier uses vocabulary uncharacteristic for defining the concept.

For each word form, the following statistics are kept:

- number of times the word occurred in the text, which is classified by the classifier to the subject under study;
- number of times the word form has been found in a text that is not related to the research topic;
- number of words in the text classified by the classifier to the subject under study;
- number of words in the checked text are not related to the research topic.

The classifier allowed us to estimate the frequency of recourse to the definition and proximity of the content characteristics of the different author's definitions. Received results have formed the basis of the semantic network that reflects the inner content of the term (Figure 1).

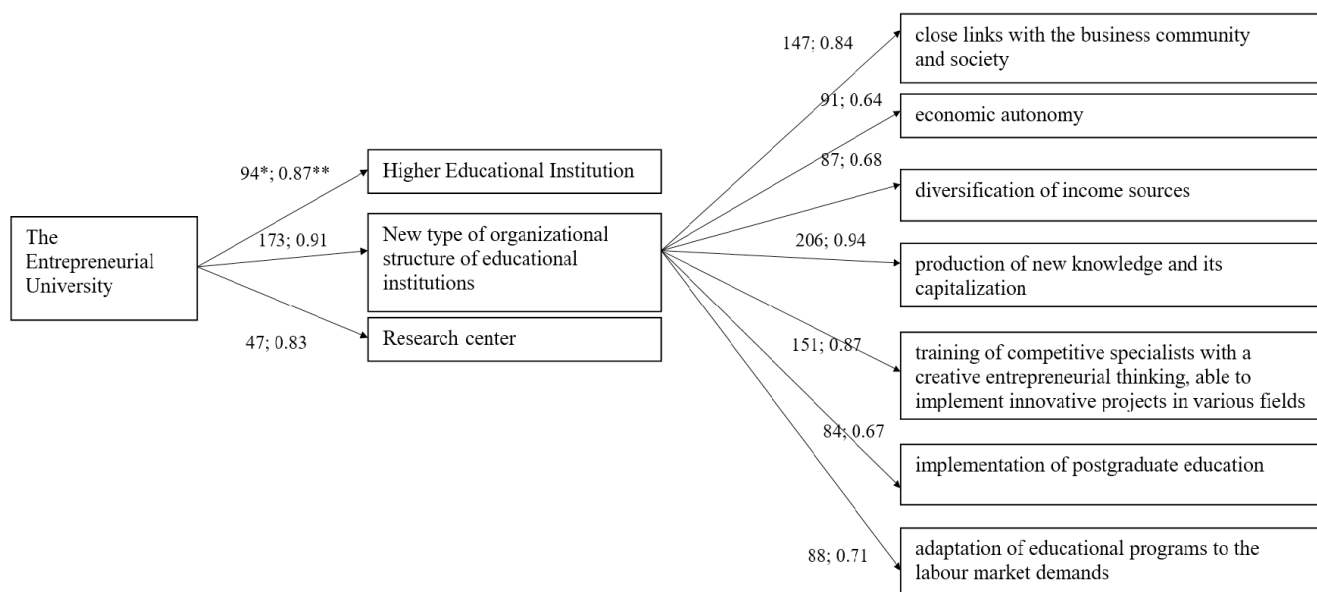
So we can highlight the six areas of research of "entrepreneurial university": organization and development of entrepreneurial research university; creation of offices for the promotion and technology transfer; the creation of new firms on the profile of the work of the universities; creation of innovation networks with universities; phenomenon of "academic entrepreneurship"; "case studies" for different countries and universities, where "academic entrepreneurship" is being successfully implemented or starting to settle down. Such a variety of research areas in different countries shows the relevance of the problem and its global impact.

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## CONCLUSION

We propose to interpret the entrepreneurial university as a new type of organizational structure of educational institutions, which specializes in the production of new knowledge and its capitalization; allows training the competitive professionals with the creative entrepreneurial thinking, able to implement innovative projects in various fields; adapts education to the needs of the labour market; forms and maintains connections with the business environment and society that leads to the diversification of the income sources and the economic autonomy.

The author's definition, based on the content of the Scopus and Google Scholar open-access databases of scientific publications does not contradict with the features of the "entrepreneurial university", formulated by Clark (1998). It also complements and expands the concept of "entrepreneurial university" as it respects the definition of entrepreneurship given by Professor of Harvard business school Stevenson (1985): "entrepreneurship is the pursuit of opportunities beyond the resources you currently control". It is confirmed by the basic criteria of leading ratings such as Academic Ranking of World Universities (2019), QS World University Ranking (2019), Financial Times Global Master's in Management Ranking (2019) and others. It allows us to conclude that the key focus in determining of the entrepreneurial university must be made on the results of the commercialization of research activities of universities, as well as the practical training of students. The essence of the implementation of this concept in the field of higher education means the transformation of educational institutions into a source of technology and knowledge that would benefit the society and the university.



Notes: the first value (\*) is the frequency of use of characteristics in selected 314 articles on entrepreneurial University, the second value (\*\*) is the closeness of the connection between the concepts defined on the basis of method of k-nearest neighbours.

**Figure 1.** The semantic network that reflects the inner content of the definition of “The Entrepreneurial University”

Despite a large number of publications, the question of the formation and development of entrepreneurial universities in Ukraine remains debatable. The solution to this problem should be based on world experience with regional characteristics of the formed system of higher education considering.

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