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PLANNING OF EDUCATIONAL SERVICES IN UNIVERSITIES IN THE CONTEX OF BRANDING CONCEPT

G. PLYSENKO[1]
[1] Kyiv National University of Technologies and Design
T. VITRYAK[2]
[2] Ukrainian State Employment Service Training Institute

Introduction and research objectives: in modern educational market, effective technique for planning educational services in the context of branding concept is simulation. The domestic educational market is characterized by a number of factors to evaluate the results of which is possible by using economic and statistical methods that would allow forecasting and sales planning of educational services.

The purpose of the study **-** factor analysis of indicators, objectively reflects the overall state of the education market in the context of branding concept.

Methodology: the study used the following general-scientific and special methods: scientific generalization and systematization - to determine the characteristics of the educational services market and define the role of the brand in this market; comparative analysis - for comparing scientific approaches to determining the role of branding concept in the education market; system analysis - to identify factors influencing the amount of realized educational services; transformation - to structure the statistical data about the state of the education market; economic and mathematical modeling - to construct multi-model planning for educational services of higher education; logical synthesis - to explain the results of the study.

Results: factor indicators objectively reflect the overall state of the education market. The estimation of the adequacy of the proposed model is performed and recommended for predicting market trends.

Conclusions: The correlation-based regression model of dependencies between targets indicators and indicators of educational services provides planning on the education market and is relevant in developing branding strategies; this model will allow universities to optimize educational activities, to increase competitive advantage on the market by removing unclaimed professions from the list of offered services.

Key words: higher education, brand, economic and mathematical modeling, education market.

Problem and its connection with important scientific and practical tasks. In modern terms of commercial products and services such thing as "brand" has come to the educational market. Due to the fact that the number of higher educational institutions sharply increased, they have become more and more similar to each other and there is a need to stand out and attract attention [10]. Brand in higher education is an effective marketing tool for raising the popularity of university, creating a positive image in the minds of potential customers and strengthening its competitive advantages on the educational market. Modeling in nowadays is effective technique when planning sales of educational services in the context of university branding concept. The domestic educational market is characterized by a number of factors to evaluate the results of which are possible by using economic and statistical methods.

Application of these methods is to conduct analysis of the studied statistical indicators and on the basis of the results construct a model of forecasting and planning educational services. Modeling helps in creating necessary consumer brand perception in the future and contributes effective brand management to facilitate its promotion and development [8].

Analysis of research and publications. Among modern scholars who studied economic-mathematical modeling should be noted: T. Klebanova, I. Balabanova, T. Vitriak [4, 5] and others. Brand modeling studied by D. Aaker, J-N. Kapfer, V. Pertsiya, V. Shcherbak [10] A. Bychova [3] etc., among Ukrainian scholars: G. Studinska [8] S. Shtovba [9] and others. Analysis of the trends of the educational market was studied: Y. Gava [6] T. Morhulets [7] and others.

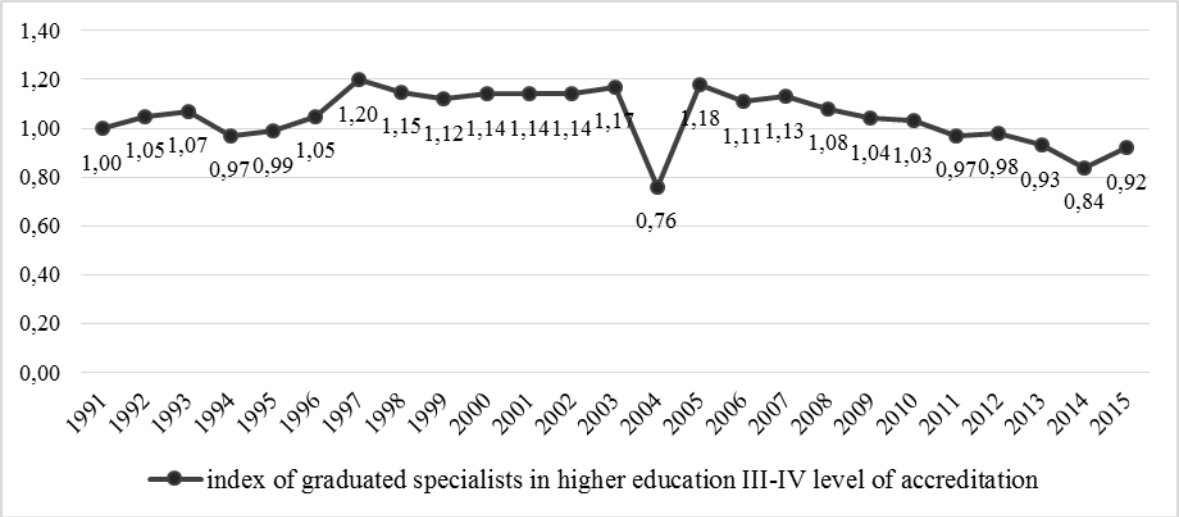
Unsolved aspects of the problem. Brand in higher education is studied by many modern scholars. But, it should be noted that some issues are given insufficient attention, namely the determination of the required amount of educational services for further implementation in the context of university brand modeling.

Research objectives. Justification of economic-mathematical multifactor model of Universities Educational Services planning and explore the possibilities of its use for predicting market trends.

The main research material. Market of educational services is a specific segment of the service market, which has a special place in the market infrastructure of the country and which inherent market relations and mechanisms of influence on supply and demand. The market of educational services meet the laws of supply and demand. The product of educational services are graduates specialist which are the result of industrial relations between the owners of educational services, later serving as human capital in the labor market [6, p.92].

The main task of the university is implemantation of education activity at a high level that provides people with degrees appropriate for their chosen professions and dissemination of knowledge among the population, raising the educational and cultural level of citizens. [1] Without the involvement of the appropriate number of applicants these tasks can not be achieved. Branding concept helps to operate the brand, aimed at long-term customer loyalty to its associated products or services. The key in this definition is term "brand", which refers to a complete set of trademark and related sustainable knowledge, images and associations, which increases the sales of the products or service [9]. Economy that bases on the principles of competition can not exist without a signal which is transmitted via certain information about the quality or product features, creating the image of the company (organizations, companies, etc.). To obtain success in the market of goods and services it is necessary to find a method and a way to influence potential customers. In modern conditions of economic development brand is consdered as a key element of the strategic development of the company due to the fact that it takes the value of powerful economic factor of stability and creates competitive advantages for enterprises in the fierce competition [3].

The development of the education market is affected by a number of factors. One of which is the number of graduated professionals. To reflect the situation, was used the indicator of graduated specialists in 1990-2015 (Figure 1).



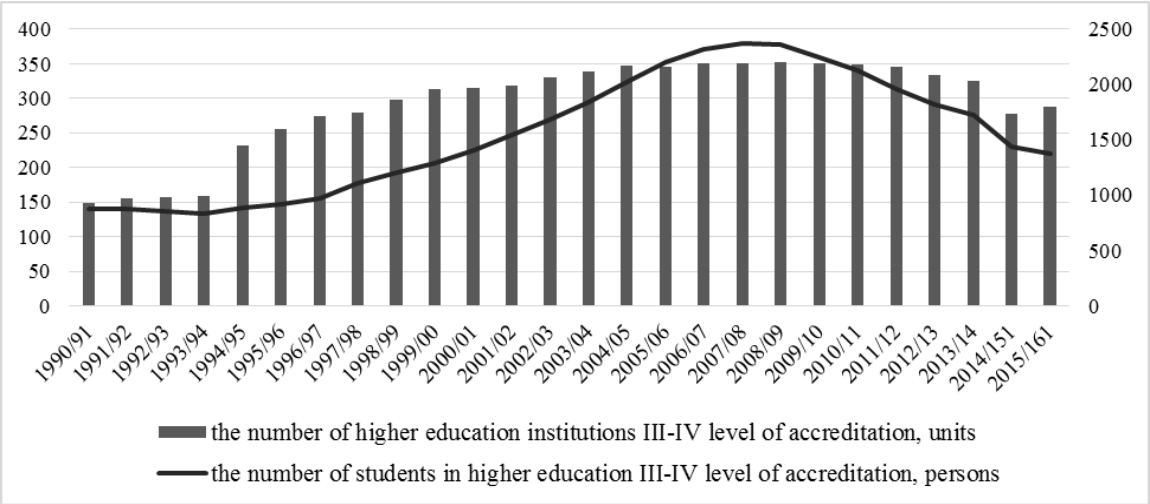
Source: developed by authors based on the data of [2]

Figure 1. **Dynamics of graduated specialists index in 1990-2015**

There is a trend of sharp fluctuations of the index during the selected period, a correlation between this indicator and birth rate in Ukraine. The index takes the maximum value in 1997 and the lowest value in 2004. And since 2005 the number of students who get higher education began to decline.

Dynamics of the number of students in Ukraine in absolute terms reflects both demographic trends that had and are taking place in the country and the attitude of the society to higher education. The trend of steady growth in the number of students that took place in the second half of the 1990 was primarily a manifestation of Ukraine's transition to mass higher education. The demographic crisis in Ukraine in the last decade of the last century, such as the sharp drop in fertility, now has its consequences in the form of reduction in the number of high school graduates, i.e. potential applicants [7].

Another important factor that influences the development of the education market is the number of universities. During 1991 2015 changes the number of universities in the context of III-IV accreditation levels (tended to increase), from 149 universities in 1991 to 288 in 2015, i.e. 139 universities, or 93% (Figure 2). The trend shows that in 1990/91-2004/05 the number of universities increased not proportional to the number of students. Since 2005/06 the number of students prevailed over the number of universities. From the 2010/11 the number of students and number of universities have started to decline. The rate of decrease in the number of students exceeded the rate of decline in the number of universities and only in 2014 they nearly equaled, reflecting the relationship.

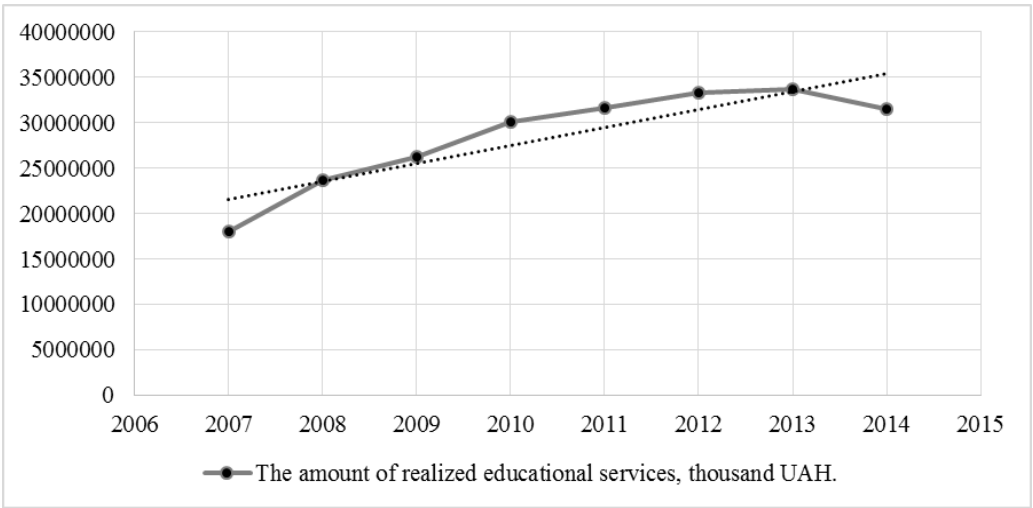


Source: developed by authors based on data [2]

Figure 2. **Dynamics of III-IV accreditation universities**

To take into account all available parameters that affect the education market was highlighted one of the main indicators, namely the amount of realized educational services. To determine the density of effective connection between the results, factor values and building of economic and mathematical models was performed a correlation analysis of indicators.

Exploring the scope of educational services implemented it is advisable to substantiate methodological principles of mathematical modeling of this connection. Preliminary study of existing ties and choice of the type of mathematical model requires correlation field (Figure 3).



Source: developed by authors based on data [4]

Figure 3. **Correlation field of indicators of implemented educational services**

Each point on the graph reflects the value of the amount of realized education services each year during the 2006-2014, and the set of result and factorial points is a correlation field. Built trend line suggests the linear character of relationships.

To take into account all available parameters that affect the education market was highlighted one of the main indicators, namely the amount of realized educational services. To determine the density of effective connection between the results, factor values and building of economic and mathematical models was performed a correlation analysis of indicators [5].

To determine the sales of educational services was created multifactor correlation-regression model. During model building, it was hypothesized that the resulting figures are influenced by such factors as: the cost of research in higher education (mln. UAH); number of universities; nominal GDP; economically active population (age 15-70 years); the number of graduated students in universities; the number of doctoral students in universities.

The model in the simplest version will be:

$$Y = a_0 + a_1x_1 + a_2x_2 + a_3x_3 + a_4x_4 + a_5x_5, \quad (1)$$

Y – target index, x_1- x_5- impact factors, a_0, a_1, a_2, a_3- regression coefficients that meet the smallest sum of squared deviations of actual Y deducted by model.

Now we use package "Data analysis" in MS Excel, which quickly performs economic and mathematical calculations, and construct multifactor linear and nonlinear models and more.

A model allows to determine the volume of sales of educational services, to assess the correlation between the performance of higher education and facilitates the planning process of the education market development. The model will be:

$$Y=994385,7+9,098x_1+16,37x_2-1427,7x_3+1386,99x_4-3178,87x_5,$$

X_1- the cost of research in higher education (mln. UAH); X_2- nominal GDP (mln. UAH); X_3- economically active population (age 15-70), thousand. people; X_4- the number of graduate students in universities, individuals; X_5- number of PhD students in universities, individuals.

The proposed correlation and regression model creates opportunities for calculating the target index according to the values of the education market development. This approach can be used when planning sales of educational services, enabling more accurate planning and allocation of budgetary funds of universities.

Application of Excel allowed to calculate (Table 1): regression coefficients (a_0, a_1,.....a_4, a_5); multiple correlation coefficient (R), which reflects the extent of the joint impact of independent variables on the dependent variable value (density of connection) and within [0; 1] (the more closer value of R to 1, the more dense the connection); coefficient of multiple determination (R2), which describes the proportion of variation of resultant index, due to the influence of factors reflected in the regression model and within [0; 1]; F - Fisher criterion for assessing the adequacy and reliability of the model, i.e. the possibility of a reliable prediction of the average values of resultant variable according to the values of the factors. Criterion F can be calculated, and in future must be compared with tabulated values. If F exceeds the critical F, the model is considered significant.

Table 1

Indicators of the adequacy of Universities Educational Services planning model (statistical data of 2007-2014)

Multiple correlation coefficient (R)	0,981647
Coefficient of multiple determination (R^2)	0,963631
F – Fisher criterion	10,59
F – Fisher critical criterion	2,96

If before the independent variable there is a "+" sign, it means that it is directly affect the dependent variable value, otherwise the effect is inversely proportional. Characteristics of each detected depending conditioned by social and economic development of the country or a region in particular.

Prospects for further research are forecasting volumes and optimization based on predictive models range of educational services.

Conclusions and prospects for further research. Constructing correlation-regression model of dependencies between target indexes and indicators of sales of educational services can be noted that this model provides an opportunity to influence the planning of major indicators of the education market and are relevant in developing brand strategies. Universities seeking to increase their competitive advantage, by developing a brand strategy should take into account market conditions and plan more rationally educational services that can be offered to potential customers. Practical use of the proposed approach for planning of educational services will allow university to optimize educational activities, to increase competitive advantage in the education market by removing unclaimed professions from the list of offered services. Prospects for further research are: forecasting of volumes and optimization based on predictive models of educational services range.

References

1. Zakon Ukrainy «Pro vyschu osvitu» №1556-VII, iz zminamy vid 01 lypnia 2014 r. [Electronic resource]. Retrieved from: http://zakon0.rada.gov.ua [in Ukrainian]
2. Derzhavna sluzhba statystyky Ukrainy. [Electronic resource]. Retrieved from: http://www.ukrstat.gov.ua [in Ukrainian]
3. Bykhova O. M. (2013) Upravlinnia torhovoiu markoiu v mekhanizmi tovarnoi innovatsijnoi polityky pidpryiemstva: monohrafiia [Office trademark in the mechanism of enterprise innovative policy: monograph] O. M. Bykhova, V. H. Scherbak, H. O. Kholodnyj, O. V. Ptaschenko. Kharkiv. Vyd. KhNEU - 252 [in Ukrainian].
4. Vitriak T. B. (2016) Metodychni aspekty modeliuvannia zalezhnosti rivnia zajniatosti vid obsiahiv kapital'nykh investytsij [Methodological aspects of modeling employment depending on the volume of capital investments]. T. B. Vitriak, Intelekt XXI, issue №3, 49- 56 [in Ukrainian].
5. Vitriak T. B. Ekonomiko-matematychne obgruntuvannia bahatofaktornoi modeli rehional'nykh rynkiv pratsi Ukrainy [Economic-mathematical justification of multifactor models of Ukraine regional labor markets], / Vitriak T. B. / Ukraina: aspekty pratsi, issue № 5-6, 2016, 38-44 [in Ukrainian].
6. Hava Yu. V. Osvitni posluhy v Ukraini [Educational services in Ukraine] / Hava Yu. V. (2013) Ekonomika: teoriia ta praktyka [Economics: Theory and Practice], issue №1, 86- 93 [in Ukrainian].
7. Morhulets' O. B. Suchasnyj stan ta tendentsii rozvytku diial'nosti VNZ Ukrainy [Current status and trends of Ukraine universities development], Visnyk Zhytomyrs'koho derzhavnoho tekhnolohichnoho universytetu [Bulletin of Zhytomyr State Technological University]. Seriia: Ekonomichni nauky, 2015, issue №3, 85 - 93 [in Ukrainian].
8. Studins'ka H. Ya. Teoretyko-metodolohichni pidkhody do modeliuvannia brenda [Theoretical and methodological approaches to modeling brand] / Formuvannia rynkovykh vidnosyn v Ukraini [The formation of market relations in Ukraine], 2014, №12, 119 - 126 [in Ukrainian].
9. Shtovba S. D., Shtovba O. V. Nechitki tekhnolohii v brendynzi [Fuzzy technologies in branding]. [Electronic resource]. – Retrieved from: http://ir.kneu.edu.ua:8080/handle/2010/3312 [in Ukrainian].
10. Shcherbak V. Genesis of creation and development of brand-capital of Kyiv national university of technologies and design, V. Shcherbak, Zbirnyk naukovykh prats' «Menedzhment» 2016, vypusk 23, 48 -61 [in Ukrainian].