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## ANALYSIS OF THE EDUCATION MARKET TRENDS DEVELOPMENT IN UKRAINE

**Abstract:** The report is devoted to some forecasting aspects of the HEI development, on the basis of methods of econometrical modeling that allow revealing the common trends for improving marketing policy of the HEI. In order to analyze the development of the education market and to forecast the market environment condition the adapting forecasting methods are implemented in this research.

Modern condition of the education market in Ukraine is characterized with such negative tendencies as decrease in number of the HEIs of I-IV levels of accreditation, decrease in number of students and graduates that leads to increasing competition level. This requires the implementation of new promotion measures for education services, moves to the first place the formation of effective marketing strategy of the HEI, the component of which is the brand development strategy.

In order to analyze the development of the education market and to forecast the market environment condition the adapting forecasting methods are implemented in this research. The advantage of the adaptive methods is that they allow building the self-adjusting economic-mathematical models which are able to respond promptly to the change in conditions by taking into account result of the forecast made on the previous step and different informational value of the range levels.

As the informational basis for the research the data of the State Statistics Service of Ukraine for 2009-2016 were used [1]. As it was mentioned above, adaptive methods of forecasting were used in order to predict the indicators of number of HEI, number of students of HEI, number of accepted students, number of students of general educational institutions. The graph of the dynamics of number of HEI is shown in fig.1.

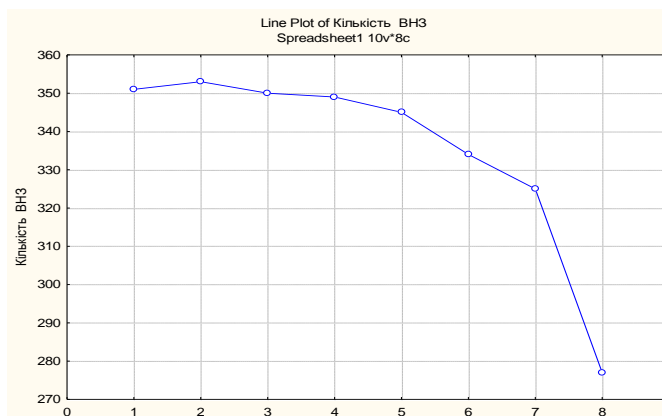


Fig. 1. Dynamics of HEI in Ukraine for 2008-2015

As it is seen from the fig. 1, the decreasing trend is characteristic for the analyzed time series, that is why the Holt model (exponential smoothing model based on linear trend) was used for the research. The calculations were carried out using Statistica program [4]. The determination of the optimal adaptation parameter is done on the basis of the grid search options (fig. 2). [3, 4].

Model Number	Parameter grid search (Smallest abs. errors are highlighted) (Spreadsheet1) Model: Linear trend, no season ; S0=356,3 T0=- 10,6 Кількість ВНЗ							
	Alpha	Gamma	Mean Error	Mean Abs Error	Sums of Squares	Mean Squares	Mean % Error	Mean Abs % Error
81	0,900000	0,900000	-4,65530	8,246585	1642,925	205,3656	-1,70768	2,727404
72	0,800000	0,900000	-4,69904	8,476178	1651,291	206,4114	-1,72349	2,795639
80	0,900000	0,800000	-4,64044	8,363389	1672,937	209,1171	-1,70882	2,765869
71	0,800000	0,800000	-4,68930	8,572160	1706,582	213,3227	-1,72862	2,830714
79	0,900000	0,700000	-4,60013	8,509745	1719,291	214,9114	-1,70431	2,814459
63	0,700000	0,900000	-4,79912	8,994455	1721,540	215,1925	-1,76172	2,952733
70	0,800000	0,700000	-4,64273	8,913881	1779,093	222,3866	-1,72482	2,937665
78	0,900000	0,600000	-4,51026	8,718495	1782,071	222,7589	-1,68702	2,882302
62	0,700000	0,800000	-4,78464	9,330395	1807,355	225,9193	-1,76849	3,059407
77	0,900000	0,500000	-4,33184	9,159733	1858,154	232,2693	-1,64504	3,017239

Fig. 2. Determination of the adaptation parameter of the smoothing model

As it is seen from the fig. 2, the minimal value of the criterion of mean absolute percentage error of the forecast (m.a.p.e.) equals to 2,727 % and is observed with adaptation parameters  $\alpha=0,9$ ,  $\gamma=0,9$  [3, 4]. The results of smoothing the time series with the determined adaptation parameters are shown in fig. 3.

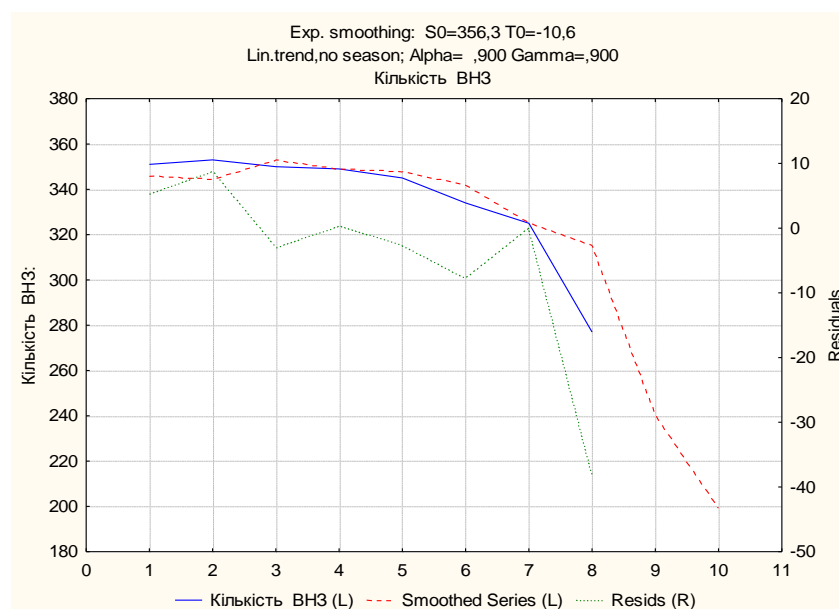


Fig. 3. Actual and estimated values of the number of HEI

According to the forecasted data, the negative tendencies of the higher education system development are observed. Saving the current tendencies, the number of HEI in 2018 will decrease to 199 HEI, that is approximately on 30% (every third HEI will stop functioning).

The criteria of assessing the forecast quality are given in fig.4. The analysis of the results received about the forecast quality allows making the conclusion that the value of the mean percentage error is 1,7%, of the mean absolute percentage error is 2,73 %, that claims about the high forecast quality and possibility to implement the received model for forecasting [3, 4].

	Exp. smoothing: S0=356,3 T0=-10,6 (Spreadsheet1) Lin.trend,no season; Alpha= ,900 Gamma=,900 Кількість ВНЗ
Summary of error	Error
Mean error	-4,65530035044
Mean absolute error	8,24658518572
Sums of squares	1642,92458562244
Mean square	205,36557320281
Mean percentage error	-1,70767534343
Mean abs. perc. error	2,72740426380

Fig. 4. The criteria of assessing the forecast quality

The forecasted values of the number of HEI for 2016-2017 are shown in fig. 5.

	Exp. smoothing: S0=356,3 T0=-10,6 (Spreadsheet1) Lin.trend,no season; Alpha= ,900 Gamma=,900 Кількість ВНЗ		
	Кількість ВНЗ	Smoothed Series	Resids
Case			
1	351,0000	345,7143	5,2857
2	353,0000	344,1814	8,8186
3	350,0000	352,9712	-2,9712
4	349,0000	348,7435	0,2565
5	345,0000	347,6285	-2,6285
6	334,0000	341,7879	-7,7879
7	325,0000	324,9956	0,0044
8	277,0000	315,2199	-38,2199
9		240,0842	
10		199,3464	

Fig. 5. The forecasted values of the HEI

**CONCLUSION.** Thus, the performed researches and received results of estimations allow confirming the assumption that, currently, for the education market, rapid crisis trends, which can be still observed for a long time, are characteristic. Such tendencies are connected to both general complicated situation in Ukraine and to that fact that currently there is a decrease in the interest to the national higher education among the entrants. All of this testifies the necessity of the further formation of the HEI brand development strategy that will allow increasing the loyalty among consumers of the HEI education services.

#### LITERATURE

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