Economic diagnostics of private higher education activities: organization and methodology

A.D. Bazarbekova
Kazakh Economic University named after T. Ryskulov, Kazakhstan, Almaty, Zhandossov str 55, 050035

Abstract

The article deals with the fact that in a market economy is increasing the value of the private higher education activities for profits maximization purpose, increasing the profitability of the company meets with factor, economic diagnostics analysis for further business development. The purpose of this paper is to analyze profitability of higher education service, to identify the measures of enterprise efficiency assessment on the basis of factor diagnostic analysis. Scientific novelty: The assessment of the role, purpose and content of revenue and profitability diagnostics in Kazakhstani private universities. In writing these work financial statements of the universities were used.

Keywords: factor analysis, profitability, ratios, diagnostics, activities, private higher educational institutions.

1. Main text

Today’s primary method as specific type of the enterprise assessment is companies economic diagnostics, this type of evaluation allows us to connect the subject, object, method, and the range of possible actions.

The term "diagnosis" is borrowed from medicine. The word "diagnosis" (from the Greek "diagnosis") means the recognition, definition. It is a process of diagnosis research facility to archive the diagnosis, i.e. conclusions about the position of the object according to diagnosis. This way, the essence of diagnosis is to identify pathological changes in this system and diagnosis. Diagnostics as a way to recognize the position of socio-economic systems through a comprehensive set of research procedures and to identify weaknesses in links and bottlenecks related to the methods of indirect measurements.

Theoretical basis of diagnostics are well represented in the works of scientists and economists:
Podani (1999), Richard A. et.al(1994), Saporta (2006), X. Wang, et.al (2007), Дюсембаев К.Ш. (2009), Рахметова Р.У. et.al (2011), Шеремет А.Д. et.al (2001), Шниппер Р.И. (1996). They defined the nature and form of diagnostics, its role in the economic analysis, explored procedures and methods of diagnostics, have developed techniques of practical application of company diagnostic analysis.

Elements of socio-economic systems, the properties of which are to be determined are inaccessible to direct observation and measurement. Therefore they should not be measured as parameters itself, but through the process of parameters generated by the elements of these systems and have to be available for the measurement. Figure 1 shows the characteristics of diagnostic process.

Economists give a number of definitions of economic diagnostics. Thus, Р.И. Шниппер (1996) under economic diagnostics involves "examining the status of the entity, factors that affects for socio-economic processes development and identification of deviations from normal development. Economic diagnostics is focused both on the knowledge of economic contradictions and for its measures development. The complex nature of economic diagnostics is to follow the dynamics of the processes studied in relationship to investigate backward and forward linkages between processes. Diagnostic methods designed to reflect the cause-and-effect relationships and its dependencies."

**Figure 1. Characteristics of a diagnostic process.** Developed by authors

The organizational structure of Kazakhstan's higher education is characterized by a set of jobs (teachers), positions, government and industrial divisions, forms from relationships that achieve the strategic goals of the university. Moreover, formed on the basis of the requirements to ensure its long-term competitiveness goal, efficiency, and expediency.

Economic diagnostics is the basis for the study and weighing management decisions within the business, innovation, investment, industrial, financial and other activities of modern enterprises. On the basis of the results of economic diagnostics managers develop recommendations for enterprise economic mechanism stabilization and financial condition improvement.
Complex diagnostics results of company activities

1. Formation of the feature space

2. Drafting a matrix of the original data

3. Identification of company position

   Step 3.1 Training:
   - Bringing the original data matrix with the weighting value based on the selected features;
   - The calculation of mean vector estimation;
   - The calculation of the covariance matrix;
   - Total estimate of the covariance matrix

   Step 3.2 Decision-making:
   - The calculation of log-likelihood ratio estimation;
   - The assignment of the investigated companies to class of successful or to the class of crisis enterprises

   Step 3.3 Evaluation of the reliability of diagnosis

4. Identification of the state of the company over time

   4.1 Definition of the time interval for diagnostics company position in the dynamics

   Step 4.2 Calculation of estimates log-likelihood ratio in each segment of the time interval

   4.3 Classification of the investigated companies to the class of successful or to the class of crisis enterprises in each segment of the time interval

5. Prediction of enterprises future position

Figure 2. Structure-logic for a comprehensive diagnosis of enterprise economic performance. Developed by authors.

Integrated economic diagnosis of the company consists of five main stages, which are interrelated and presented in a strict sequence, which provides the desired result. The implementation of each stage is impossible without previous. The main target installation diagnostics financial condition is its evaluation and identification of reserves stabilization, improvement and growth. Means of implementation of this installation is the organization of main financial and economic policies. Diagnostic tool for the evaluation are the number of analyzed factors indicators. The purpose of company economic diagnostics - the financial condition and dynamics of the economic entity. Rapid diagnosis are encouraged to assess the method of financial ratios.

Rating of the private universities of Kazakhstan invited to the five indicators, the most commonly used and relevant to financial condition:
1. Return on sales ratio: \( T(\text{NI}) > T(\text{Rev}) \),
2. Profitability of sales ratio: \( T(\text{NIOA}) > T(\text{Sales}) \)
3. Return on equity: \( T(\text{NI}) > T(\text{Capital}) \)
4. Profitability of fixed assets ratio: \( T(\text{NI}) > T(\text{WC}) \)
5. Profitability ratio of working capital: \( T(\text{NI}) > T(\text{BV}) \)

To assess the effectiveness of the financial results of business commercial university system was used analytical indicators - net income and profitability. Дюсембаев К.И. (2009)

We chose from financial statements important for our research these indicators:
- Gross profit, defined as the difference between the sales or revenue of goods and the cost of goods sold;
- Operating income, which is calculated as the algebraic sum of gross profit, other operating income, administrative expenses, marketing and other operating expenses;
- Profit from operations is determined by the algebraic sum of operating income and other financial income, financial and other costs;
- Net income, calculated as the algebraic sum of the profit from ordinary activities and extraordinary income and extraordinary loss of taxes on extraordinary profits.
- The main influenced factor in profitability ratios of commercial products is the change in the level of cost of goods sold. Contrary directly proportional relationship to the volume sales of marketable products in the profit level, the relationship between the amount of income and the level of costs is reversed. The lower the cost of products sold, determined by the level of production costs and selling, the higher the profit, and vice versa. Richard A. et.al(1994) We took the data to determine the financial condition from the financial statements for the years 2009-2011.

Table 1—Growth and value rank indicators for 2009-2011., in thousands of tenge

| Indicators      | 2009           | 2010           | 2011           | 2010 rank | 2011 rank |
|-----------------|----------------|----------------|----------------|------------|------------|
| Sales/Revenue   | 3 105 706,0    | 3 338 420,0    | 3 371 952,0    | 1,075      | 1,010      | 1,053      | 1,040      | 1,038      |
| Direct costs    | 407 204,0      | 576 127,0      | 845 800,0      | 1,415      | 1,468      | 1,111      | 1,053      | 1,038      |
| NIOA            | 1 193 970,0    | 1 326 129,0    | 1 376 581,0    | 1,111      | 1,038      | 1,053      | 1,040      | 1,038      |
| Expenses        | 1 911 736,0    | 2 012 291,0    | 1 995 371,0    | 1,053      | 0,992      | 1,053      | 1,040      | 0,992      |
| Working Capital | 1 246 253,0    | 1 308 942,0    | 1 604 507,0    | 1,050      | 1,226      | 1,050      | 1,053      | 1,226      |
| COGS            | 1 935 716,0    | 2 012 291,0    | 1 995 371,0    | 1,040      | 0,992      | 1,040      | 1,040      | 0,992      |
| Book Value      | 6 134 474,0    | 6 970 167,0    | 7 583 131,0    | 1,136      | 1,088      | 1,136      | 1,136      | 1,088      |
| Capital         | 4 178 101,0    | 4 928 103,0    | 5 602 314,0    | 1,180      | 1,137      | 1,180      | 1,180      | 1,137      |
| Net Income      | 786 766,0      | 750 002,0      | 530 781,0      | 0,953      | 0,708      | 0,953      | 0,953      | 0,708      |

*Based on the data from income statements and balance sheets. Calculated by authors*

To calculate the matrix model of the university, there was not enough for analysis financial performance of absolute earnings, so the systematically we used relative analysis of the profitability depending on the rank of importance and inversions, it is indicated in Table 2.

Table 2 - Table of inversions

| Indicators | Normative rank | Actual rank | Inversion |
|------------|----------------|-------------|-----------|
| Sales/Revenue | 3 105 706,0    | 3 338 420,0    | 3 371 952,0    |
| Direct costs    | 407 204,0      | 576 127,0      | 845 800,0      |
| NIOA            | 1 193 970,0    | 1 326 129,0    | 1 376 581,0    |
| Expenses        | 1 911 736,0    | 2 012 291,0    | 1 995 371,0    |
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| Capital         | 4 178 101,0    | 4 928 103,0    | 5 602 314,0    |
| Net Income      | 786 766,0      | 750 002,0      | 530 781,0      |
The amount of inversions

Based on the data from income statements and balance sheets. Calculated by authors

The table inversions identified that in 2010 year-26 violations and for 2011 year-28 violations.

2. Estimates of financial stability on the block of the financial independence

Calculation of financial stability indicators for the year 2010:

\[ Y^b = 1 - \frac{\sum_{i=1}^{9} m_i}{n(n-1)} = 1 - \frac{13 + 13}{9(9-1)} = 0.638888 \]

Calculation of financial stability indicators for the year 2011:

\[ Y^o = 1 - \frac{\sum_{i=1}^{9} m_i}{n(n-1)} = 1 - \frac{14 + 14}{9(9-1)} = 0.611111 \]

Based on the above calculation the university is in a stable position, as \( Y_o = 0.61111 > 0.5 \)

Table 3 - Inversions for 2010 and 2011 years

| Indicators       | Actual 2010 Rank (i) | Actual 2011 Rank (j) | Inversions |
|------------------|----------------------|----------------------|------------|
| Sales/Revenue    | 5                    | 6                    | i < j 0    |
|                 | 4                    | 0                    | i > j 1    |
| Direct costs     | 1                    | 1                    | i < j 0    |
|                 | 0                    | 1                    | i > j 1    |
| NIOA             | 4                    | 5                    | i < j 3    |
|                 | 3                    | 1                    | i > j 1    |
The next stage of company profits analysis is to study the factors that contributed to its change, i.e. of factor analysis. Factor analysis is a method of studying the complex and measure the impact of factors on the output indicators. Рахметова Р.У. et.al (2011)

Using the method of elimination, based on the data in Table 4 we define the company impact on the net profit of each factors.

### Table 4 - Factor analysis of sustainability assessment of the profitability on the activities

| Indicators          | № | 2010 year | 2011 year | Dynamic diagnostics | Economic diagnostics |
|---------------------|---|-----------|-----------|---------------------|----------------------|
|                     |   |           |           | ΔU (P i) | a i, % | β i, % | ΔU * (P i) | b i, % |
| Sales/Revenue       | 1 | 4         | 5         | -0.0139  | -0.0217 | 0.16578 | 0.0694     | 0.1786  |
| Direct costs        | 2 | 1         | 1         | 0.0000   | 0.0000  | 0.00000 | 0.0139     | 0.0357  |
| NIOA                | 3 | 3         | 4         | -0.0139  | -0.0217 | 0.16578 | 0.0556     | 0.1429  |
| Expenses            | 4 | 2         | 3         | -0.0139  | -0.0217 | 0.16578 | 0.0417     | 0.1071  |
| Working Capital     | 5 | 2         | 3         | -0.0139  | -0.0217 | 0.16578 | 0.0417     | 0.1071  |
| COGS                | 6 | 2         | 2         | 0.0000   | 0.0000  | 0.00000 | 0.0278     | 0.0714  |
| Book Value          | 7 | 6         | 5         | 0.0139   | 0.0217  | -0.16578| 0.0694     | 0.1786  |
| Capital             | 8 | 6         | 5         | 0.0139   | 0.0217  | -0.16578| 0.0694     | 0.1786  |
| Net Income          | 9 | 0         | 0         | -0.0560  | -0.0877 | 0.66844 | 0.0000     | 0.0000  |
| Sum                 | 26| 28        |           | -0.0838  | -0.1311 | 100      | 0.3889     | 100     |

Based on the data from income statements and balance sheets. Calculated by authors

This factor analysis states that changes in the performance of dynamic diagnosis was -8.38% with a
given share changes in each indicator for 2011. Column economic diagnostics describes the changes for 2011 for each indicator separately and their weight in general.

These tables show that almost all major indicators of university financial and economic activities for the 2010-2011 period was increased.

Our calculations showed that almost all major indicators of financial and economic activities of private education institution’s is going to increase. Thus, the revenues from services of the University at current prices amounted to KZT 3,371 million, which is 1.1% percent more than the previous year.

Tends to increase and the cost of goods sold, as compared with 2010, when it amounted to 2,012 th. tenge in the analyzed period, it dropped to 1995 thousand tenge, the decline was about 0.01%.

However, it should be noted about sharp increase in operating costs for the company, comparing the figures of the previous year and 2011 period. The greatest increase in operating costs brought increase in the other operating expenses (approximately 121.4%), the smallest increase is in administrative costs (about 102.4% comparing to the previous year). The level of operating expenses rose slightly.

University in 2011, considered possible to increase the salaries of its employees, therefore, the payroll has increased significantly and amounted to 114.8% last year. However, the indicator of the payroll in 2011, has less value than the figure of the previous year (6.8%).

Profit from operations rose nearly 1.038 times and totaled 1376 thousand compared to 1,326 th. tenge past 2010 year.

Net income earned by the university in 2011 amounted about 530 thousand tenge, and declined about 29% compared to the same period last year.

![Fig. 3-Net Income Forecast](image)

Based on the data from income statements and balance sheets. Calculated by authors

Net Income also have positive growth trend and the average value of the fixed assets and working capital, growth trends from 8.8% and 22.6%, respectively.

Analysis of financial and economic activity can benefit the organization and contribute to the process efficiency of strategic planning. The study of financial performance management can describe internal strengths and weaknesses in the long term. Paxmerona P.Y. et.al (2011) Based on the above data, we can analyze and forecast future cash flows by 4 quarters for 2012, the forecast summary provided in Table 5.

| Table 5 - Profitability forecasting for-2012 year |
|-----------------------------------------------|
| Indicators | Projected absolute indicators in th. tenge |
|------------|-------------------------------------------|
|            | 17Q          | 18Q          | 19Q          | 20Q          |
| Sales/Revenue | 861 170,36   | 866 157,26   | 870 874,47   | 875 349,65   |
| Direct costs   | 232 589,53   | 239 787,45   | 246 358,64   | 252 403,54   |
Based on the data from income statements and balance sheets. Calculated by authors.

Using the projected figures for 2012 year, have been identified positive growth rate and rank the factors in virtually all indicators except for fixed assets of the university.

Table 6 - Projected absolute value, growth, and value of the rank of profitability in 2012 year.

| Indicators     | Absolute numbers in th.tenge | Growth rate | Rank 2011 | Rank 2012 |
|----------------|------------------------------|-------------|-----------|-----------|
|                | 2010 year | 2011 year | 2012 y.-forecast | 2011 year | 2012 year (forecast) |
| Sales/Revenue  | 3 338 420,0 | 3 371 952,0 | 3 473 551,8 | 1,010 | 1,030 | 6 | 7 |
| Direct costs   | 576 127,0 | 845 800,0 | 971 139,2 | 1,468 | 1,148 | 1 | 3 |
| NIOA           | 1 326 129,0 | 1 376 581,0 | 1 488 060,3 | 1,038 | 1,081 | 5 | 5 |
| Expenses       | 2 012 291,0 | 1 995 371,0 | 2 228 957,9 | 0,992 | 1,117 | 7 | 4 |
| Working Capital| 1 308 942,0 | 1 604 507,0 | 1 595 995,7 | 1,226 | 0,995 | 2 | 9 |
| COGS           | 2 012 291,0 | 1 995 371,0 | 2 343 769,2 | 0,992 | 1,175 | 8 | 2 |
| Book Value     | 6 970 167,0 | 7 583 131,0 | 7 700 640,5 | 1,088 | 1,015 | 4 | 8 |
| Capital        | 4 928 103,0 | 5 602 314,0 | 5 781 389,6 | 1,137 | 1,032 | 3 | 6 |
| Net Income     | 750 002,0 | 530 781,0 | 856 858,8 | 0,708 | 1,614 | 9 | 1 |

Based on the data from income statements and balance sheets. Calculated by authors.

However, we have a rise in terms of the inversions for the year 2012 to 32 violations compared to 2010-28 violations.

Table 7- Projected factor analysis for 2012

| Indicator      | Normative rank (i) | Factor rank | Inversions |
|----------------|---------------------|-------------|------------|
|                | 2011 year | 2012 year | 2011 year | 2012 year |

Note-Forecast for the future 4 quarters
### Sales/Revenue

\[
\begin{array}{cccc}

\text{forecast} \\
i<j & i>j & i<j & i>j \\
\hline
1 & 6 & 7 & 5 & 0 & 6 & 0 \\
2 & 1 & 3 & 0 & 1 & 2 & 1 \\
3 & 5 & 5 & 3 & 1 & 3 & 1 \\
4 & 7 & 4 & 3 & 0 & 2 & 2 \\
5 & 2 & 9 & 0 & 3 & 0 & 0 \\
6 & 8 & 2 & 2 & 0 & 1 & 0 \\
7 & 4 & 8 & 1 & 4 & 2 & 1 \\
8 & 3 & 6 & 0 & 5 & 0 & 3 \\
9 & 1 & 0 & 0 & 0 & 0 & 8 \\
\hline
\end{array}
\]

Based on the data from income statements and balance sheets. Calculated by authors

Calculation of financial stability indicators for the year 2011:

\[
Y^b = 1 - \frac{\sum_{i=1}^{9} m_i}{n(n-1)} = 1 - \frac{14 + 14}{72} = 0.61111111111
\]

Calculation of financial stability indicators for the year 2012:

\[
Y^o = 1 - \frac{\sum_{i=1}^{9} m_i}{n(n-1)} = 1 - \frac{16 + 16}{72} = 0.5555556
\]

Based on the calculation above it might be stated that the higher educational institution is in a stable position, as \(Y_o = 0.555 > 0.5\)

### Table 8- Predicted factor analysis to assess the sustainability of profitability in 2012 year

| Indicator | No | Inversions | Factor analysis |
|-----------|----|------------|----------------|
|           |    | 2011 year | 2012 year | Dynamic diagnostics | Economic diagnostics |
|           |    |           |           | \(\Delta Y(\Pi_i)\) | ai., % | \(\beta_i\), % | \(\Delta Y^*(\Pi_i)\) | 6 i. % |
| Sales/Revenue | 1 | 5 | 6 | \(-0.0139\) | \(-0.0227\) | 31,250 | 0.0833 | 0.1875 |
| Direct | 2 | 1 | 3 | \(-0.0278\) | \(-0.0455\) | 62,500 | 0.0417 | 0.0938 |
Based on the data from income statements and balance sheets. Calculated by authors.

**Conclusion**

The purpose of Kazakhstani private universities financial position diagnostics was to identify the problems of "narrow areas" in the operating activities.

Economic diagnostics assesses economic performance of the company, examines the individual results, incomplete information.

We made calculations on the basis of diagnostics of factor analysis of economic current and future position of Kazakhstan private higher education institution and its profitability assessment, which are needed for an urgent, but important managerial decisions making. We identified that analysis was a decomposition of the object into its component parts with a view to selected factor analysis. From this it follows that the diagnostics is used in the analysis and identification (diagnosis) via analysis.

From the given diagnostics through factor analysis is shown that in the forecast period will retain private higher education institution financially stable.

Higher educational institution operates on a fairly tight market segment, prices of goods and services in higher educational institution are stable and not significantly different from the prices of other universities, thus, improvement the profitability performance of the university in operating activities by external factors is not possible. Therefore, it is advisable to look for reserves of profit growth in the internal factors of the enterprise.

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