Diagnostic Process of Company Productivity

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This paper deals with an actual topic of how key factors of enterprise diagnostics can help to increase company productivity. Recognition and use of relevant internal and external information in this field determines the success of the enterprise. Application of the general diagnostic model of company productivity to the net income has been a frequent problem of company practice. This problem is of profit showing, which is an inevitable precondition for long-term company development and growth. Diagnostic access of company productivity allows recognition of specific problems in greater detail, which results from the activity of each company. This article also presents an introduction to the researched area of enterprise diagnostics, which opens opportunities for other publishing activities and can lead to information exchange.

Key Words: enterprise diagnostics, company productivity, diagnostic model
JEL *Classification:* D21, D24

Introduction

Diagnostics of a company is a part of company management. It includes organization, planning, decision-making, control and leadership. The inevitable precondition of the above management functions is information, which has recently been characterized by fast accumulation and spreading due to the use of information and telecommunication technologies.

Information on productivity is an important resource for company management. Productivity is the ability of the capital invested to appreciate. It indicates a company's ability to achieve a certain level of recurrent and steady entrepreneurial activity. The economic category called Productivity is tightly connected to another economic category called Performance. However, they are not synonymous. A company's outputs

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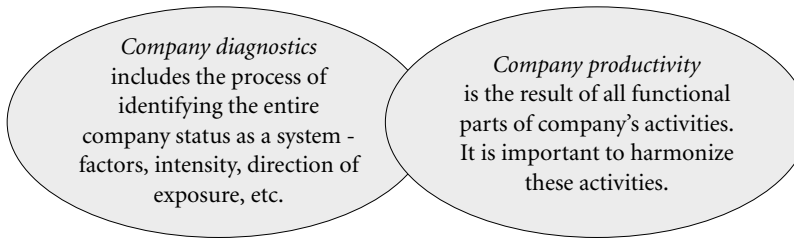

FIGURE 1 Diagnostics and productivity relation

are the results of a transformation process where inputs change into outputs. Outputs determine the level of company productivity.

Company productivity increase is the precondition for its value growth. Productivity is a permanently actual topic. It includes all parts of a company's activities, which must be fitted together to reach the maximum effect of continually increasing performance. To fulfill this aim it is important to work out a system of productivity measures, situation analysis, results evaluation and suggestions for current situation improvement. This is the subject of company diagnostics. The results of individual company functional parts diagnostics include determination of the company's current situation and identification of unused potential. Figure 1 points to the mutual relation of diagnostics and productivity.

Recently, it has become very important to increase the productivity of companies in the Slovak Republic, mainly in connection with continuing European integration processes.

Diagnostics of Company Productivity System

Company diagnostics is a process including relatively separate activities related to each-other: introductory phase, description of situation and of the diagnosed object's development, diagnostic test, diagnostic analysis, synthesis and the final phase; as shown in figure 2.

The main idea of the introductory phase is the selection of a diagnostics object, in this case the company productivity and definition of its behavior parameters. It is followed by a description of the situation and of company productivity development through the diagnostic apparatus. The following diagnostic test includes comparing the company productivity situation with the tested criterion, identification of abnormalities and definition of existing problems.

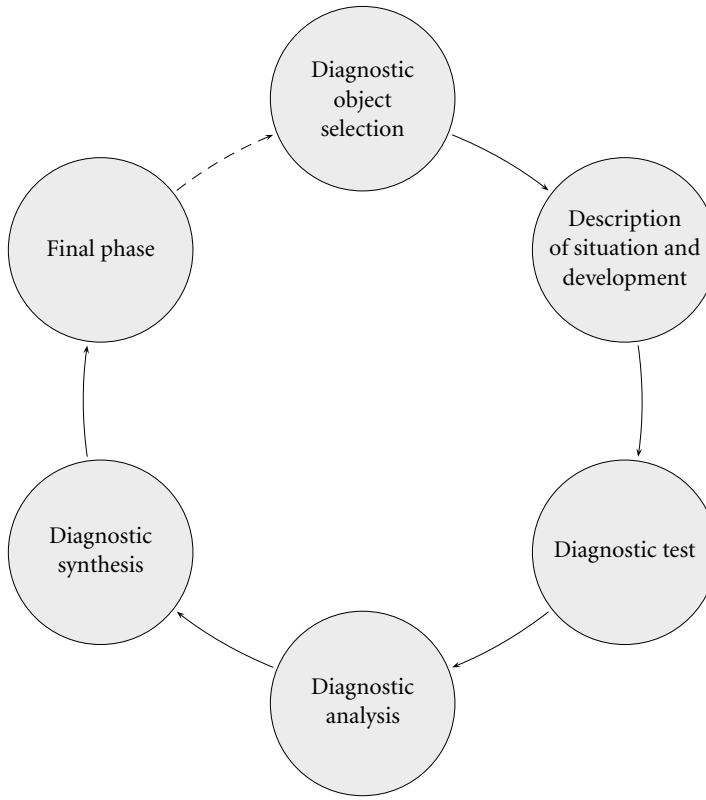

FIGURE 2 Diagnostic process structure

The fourth step of the diagnostics process is diagnostics analysis. This covers intensity, frequency, cause and direction of the problem as well as quantification of consequences and the prediction of trend. A goal of diagnostic synthesis is to define diagnosis, i. e. relevancy of a problem and urgency of its solution, as well as its main causes.

The diagnostic process culminates with the cooperation of diagnosticians to provide problem-solving suggestions and assure their effectiveness.

COMPANY PRODUCTIVITY

Company productivity is currently one of the most frequently used terms. Its content is not exactly defined; it depends on the way of interpretation according to the stakeholders or on the means of expression and quantification.

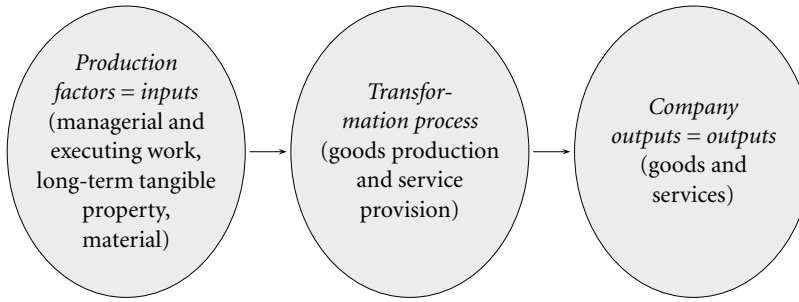

FIGURE 3 Company Transformation Process

'The most general definition of Productivity as per the economic dictionary is the capability of capital valorization. The criterion of capital valorization is net present value.' (Fibírová and Šoljaková 2005.) Invested capital is valorized through the company transformation process. This is the process of transformation of the production factors (inputs) into the company outputs (outputs). The output volume in the transformation process has to be higher than the input volume. The transformation process is the process of goods manufacturing or service providing.

The inputs and outputs – in this article, economic and transformation processes are understood with the same economic fundament, as goods production and service providing processes – can be quantified either physically or financially. Financial quantification of transformation process inputs and outputs is the subject of accounting. The main task of the accounting information is not only to illustrate the entrepreneurial process in terms of money income and expense but also to present the entire finance circulation in its reproduction process.

DESCRIPTION OF THE STATUS AND DEVELOPMENT OF COMPANY PRODUCTIVITY

Productivity as defined in the previous chapter shows the necessity of creating a set of indicators to assess the company productivity. It is important to break down net present value (the topmost indicator of company productivity) into financial indicators, which are connected to non-financial indicators. The non-financial indicators are the moving power for the financial indicators.

Financial indicators are variables expressed by the same measuring unit – the financial unit –, which is significant for their comparability.

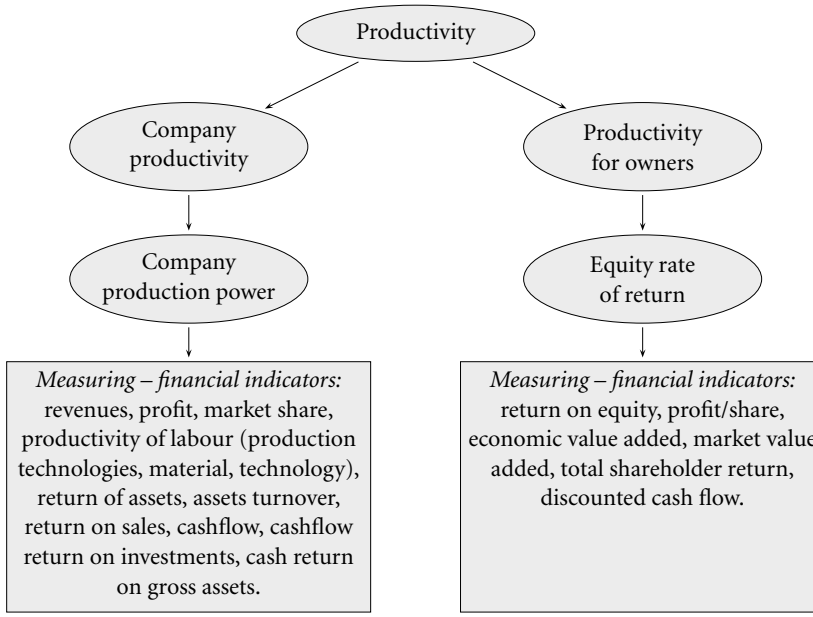

FIGURE 4 Financial indicators for measuring company's productivity

These indicators are illustrated in figure 4 (Ďurišová 2006a; 2006b), divided into financial indicators of company productivity and productivity indicators for owners. All factors influencing the level of company productivity indicators affect the level of productivity indicators for owners. But this is not true vice-versa.

The non-financial indicators are metrics based on the value and realization chains. They include delivery time, quality, service, customer satisfaction, innovation, etc.

When creating the set of principles for company productivity measurement it is necessary to keep the primary principles as follows:

- appropriate quantity;
- measurability;
- ability to influence;
- aggregation ability and possibility of up-to-down conjunction;
- transparency;
- simple definition and data collection for processing;
- recency.

COMPANY'S PRODUCTIVITY DIAGNOSTIC TEST

After description of the situation and development of the diagnosed object, the diagnostic process continues with the diagnostic test, which includes:

- definition and selection of testing criteria;
- comparison of actual situation with testing criteria;
- identification of problems.

Testing criteria are predetermined entries expressing a desired state.

The actual productivity level of a company is documented in the Balance Sheet, the Income Statement and in the Cash Flow Statement. The Balance Sheet includes information on company assets and on financial resources of their settlement. The Balance Sheet also describes conditions under which the transformation process in the company was realized. Everything is expressed in financial units. The Income Statement presents the transformation process progress and results expressed in financial units based on comparison of revenues and costs in the accounting period. The Cash Flow Statement represents all changes in the financial position through the company's cash flow. It allows evaluation of the capability of every single company activity to create cash. At the same time it shows the necessity of financial sources.

The Cash Flow Statement interconnects the Balance Sheet and Income Statement information. If there is divergences detected in the comparison of the real and desired state, problems are to be identified and classified according to their types. The existence of problems is an integral part of every company. They arise if there are any contradictions between targets, tasks deduced from them and their realization possibilities (Kašík et al. 1996; 1998).

Problems resulting from the company productivity diagnostic:

- revenues decrease;
- decrease of profit per output unit;
- decreasing market share;
- labor productivity decrease;
- decrease of return on assets, return on sales and return on equity;
- decrease of the assets turnover;
- increase in the period of operation return of investments;
- decrease of the profit per share or per investment (contribution);

- decrease of economic and marked value added;
- increasing time taken to accomplish orders;
- decrease of production quality;
- dissatisfied customers;
- problem with outputs innovation, or in process of innovation.

DIAGNOSTIC ANALYSIS AND SYNTHESIS OF COMPANY PRODUCTIVITY

The primary precondition for successful diagnostic analysis is high accuracy description of current status and of development of company productivity, and diagnostic test.

The content of diagnostic analysis is the examination of company productivity indicators, exploration of relationships, attributes and factors influencing the given situation.

Specifically, the following items are investigated in the diagnosed field:

- Periodicity or randomness of company productivity increase/decrease expressed through financial and non-financial metrics;
- Intensity (levels of) increase/decrease of indicators;
- Frequency of changes;
- Influence of the price change, production capacity, range, proportion of fixed and variable costs influencing increase/decrease of productivity;
- Reasons for output decrease – change of realization price, range of goods, and unsuitable capacity representation of each kind of output.

Diagnostic synthesis aggregates and summarizes the knowledge acquired by diagnostic analysis. It describes the seriousness of the problem, the urgency of its solution and its main causes.

Diagnostic synthesis results in diagnosis assigning, i. e. based on all activities realized in the previous phases of the diagnostic process, the status quo of company productivity is found out.

Especially, the essential problems in company productivity which endanger company existence include:

- decrease of company revenues;
- output not even reaching its critical amount resulting in insufficient fixed costs contribution (decrease of production facilities productivity, which means insufficient utilization of production capacity);

- decrease of labor productivity, material extraction;
- decrease of customer satisfaction;
- consumption increases (expressed in expenses) without adequate revenues increase.

THE FINAL PHASE OF COMPANY PRODUCTIVITY DIAGNOSTIC PROCESS

The content of the final phase of the company productivity diagnostic process is the projection of therapy for a given problem, i. e. the means of solving the problem, elimination of weaknesses, fortification of strengths, and prevention of crisis. The therapy includes time, financial and personal dimensions.

The therapy for the area of company productivity mostly includes:

1. Measures for output increase:
   - gaining new customers;
   - fulfilling customers' needs and wishes by means of quality service provision.
2. Measures for exploitation of competitors' strengths:
   - higher quality;
   - fair price;
   - service packages.
3. Lower expenses:
   - introduction of modern technologies;
   - improvement of labor and management organization;
   - increase of employees' culture-technical level.

General Diagnostic Model of Company Productivity and its Application to a Particular Problem

The general diagnostic model of company productivity includes individual activities and their effects, which it is important to realize in frames of the company productivity diagnosis. Like every other model, it provides a simplified content of economic reality according to selected criteria and answers the questions arising from its creation.

The general diagnostic model of company productivity is thereinafter applied to the net income.

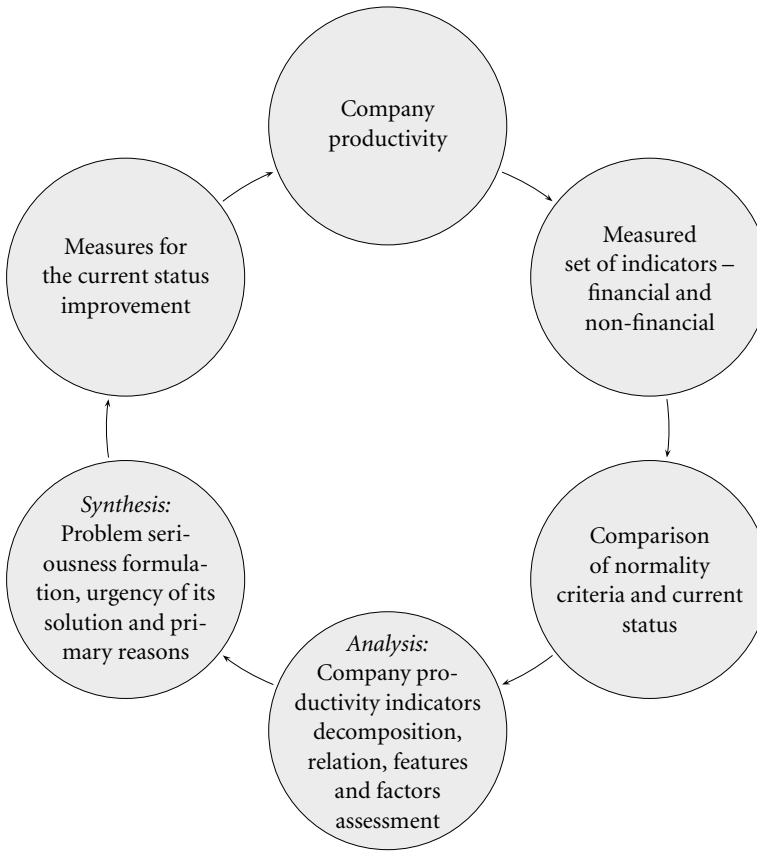

FIGURE 5 General diagnostic model of company productivity

Company's net income is a quantity indicator giving information on the company's activities and is expressed as a margin between the company's total revenues and costs. If revenues exceed costs, profit is arising, otherwise loss is created.

The goal of learning the economy structure of the trading income and the analysis of factors determining its creation is to discover possible weaknesses in the transformation process, which may decrease the company's profit potential. Information on profitable as well as loss-making activities is very valuable for successful productivity management of a company.

The main source of profit is the income from economic activities, which is one part of the income from operating activities. It is created

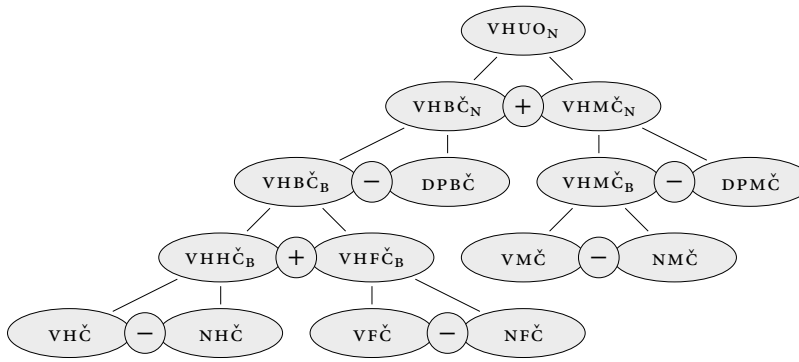

FIGURE 6 Income disaggregation model (adapted from Zalai et al. 2000), where: VHUO$_N$ – income in accounting period after taxation (net), VHBČ$_N$ – income from operating activities after taxation (net), VHMČ$_N$ – income from extraordinary activities after taxation (net), VHBČ$_B$ – income from operating activities before taxation (gross), DPBČ – income tax from operating activities, VHMČ$_B$ – income from extraordinary activities before taxation (gross), DPMČ – income tax from extraordinary activities, VHHČ$_B$ – income from economic activities before taxation (gross), VHFČ$_B$ – income from financial activities before taxation (gross), VHČ – revenues from economic activities, NHČ – costs from economic activities, VFČ – revenues from financial activities, NFČ – costs from financial activities, VMČ – revenues from extraordinary activities, NMČ – costs from extraordinary activities

as a difference between revenues from sales of goods and services and pertaining costs, i. e. realization profit representing the company's main production power. The level of the income from economic activities is influenced by the realization capacity, by the range of goods, by costs per unit, and by sales price per unit.

The income from financial activities, which is also part of the income from operating activities, is the resultant of financial revenues and financial costs. They are mostly associated with utilization of outer sources, with keeping bonds and other financial investments and with exchange rate impacts in foreign trade.

The income from extraordinary activities is determined by accidental, unpredictable events that it is not possible for company management to influence.

Summation of the income from operating activities and the income from extraordinary activities gives the income in an accounting period.

It is possible to analyze the income structure through the model of

TABLE 1 Values of the income desaggregation model in the period of 2001–2005 (in 1000 SKK)

Entry	2001	2002	2003	2004	2005
VHČ	78,191	60,014	51,113	57,887	67,751
NHČ	78,685	59,313	50,821	57,191	69,856
$VHHČ_B$ (r.1 – r.2)	–494	701	292	696	–2,105
VFČ	4,377	95	31	9	6,742
NFČ	2,640	600	742	643	3,419
$VHFČ_B$ (r.4 – r.5)	1,737	–505	–711	–634	3,323
$VHBČ_B$ (r.3 + r.6)	1,243	196	–419	62	1,218
DPBČ	22	83	24	22	248
$VHBČ_N$ (r.7 – r.8)	1,221	113	–443	40	970
VMČ	20	44	88	118	47
NMČ	0	0	2	0	0
$VHMČ_B$ (r.10 – r.11)	20	44	86	118	47
DPMČ	0	11	22	22	9
$VHMČ_N$ (r.12 – r.13)	20	33	64	96	38
$VHUO_N$ (r.9 + r.14)	1,241	146	–379	136	1,008

disaggregation that reflects balance sheet and income statement forms (as shown in figure 6).

According to recent economists, the main company goal is long-term company progress. Achievement of profit is the precondition for achieving this goal. Profit is the goal and motive for running a business (Kupkovič et al. 1996, 333).

Besides profit as an entrepreneurial goal, businessmen strive to achieve other monetary goals (securing solvency, turnover maximization etc.) and non-monetary ones (e. g. achieving economic power; obtaining independence and self-containment, achieving goodwill and creating trademark). Profit and productivity are decisive factors for strategic and tactical decision-making. Profit maximization is a prevailing criterion for decision making in a company. The level of profit is associated with a certain level of risk. The higher the expected profit (invested capital profitability), the higher the level of risk. The manager must attempt to achieve the highest possible profit, as profit is the main source of company progress and of the owner's property increase. Profit is the difference between company revenues and costs.

TABLE 2 Total Revenues Structure in 2001–2005 (in 1000 SKK)

Revenues type	2001	2002	2003	2004	2005
Sales of self produced goods and services	75,127	56,713	46,686	54,639	65,672
Changes in inventories of finished goods and work in progress	1,679	1,715	1,046	1,181	823
Revenues from long-term inventory and material sale	116	105	2,700	1,259	374
Other revenues from economic activities	1,269	1,481	681	808	882
Total revenues from economic activities	78,191	60,014	51,113	57,887	67,751
Revenues from bonds and shares	0	0	0	0	6,740
Revenues from long-term financial property	4,280	0	0	0	0
Revenue interests	97	95	31	9	2
Total revenues from financial activities	4,377	95	31	9	6,742
Revenues from extraordinary activities	20	44	88	118	47
Total revenues	82,588	60,153	51,232	58,014	74,540

There are two ways to increase profit: through cost saving (i. e. increasing efficiency), and through revenues increase, or through a combination of both. Both variables are global and are influenced by many other factors. A company obtains revenues from its activities. They are reflected in increased assets or decreased liabilities. Company costs represent financial sources effectively spent to obtain revenue. Tables 2 and 3 show the structure of total revenues and costs.

Profit is determined in the Income Statement. It is to be compiled on a monthly basis and presented as accumulated profit as of the year beginning.

Profit is monitored as EBIT that stands for profit before interest and taxes payment.

Table 4 shows income values before interest and taxes.

EBIT has a remarkable information capability, as the tax burden has been changed in the measured period. The legal entities income tax was 29 % in 2001, it dropped to 25 % in 2002 and 2003, and it has been 19 % since 2004. The level of profit after interest and taxes changes according to the tax level. Higher tax decreases profit and vice-versa. Therefore EBIT has a better information capability than profit after interest and taxes. It shows the company results more objectively, because profit after interest and taxes is influenced by the tax rate.

EBIT has been decreasing in the company since 2003, which has been

TABLE 3 Total Costs Structure in 2001–2005 (in 1000 SKK)

Cost type	2001	2002	2003	2004	2005
Material and energy consumption	28,101	28,057	17,860	21,488	26,064
Services	27,962	6,926	9,888	16,599	24,292
Salary costs	15,522	16,583	13,168	12,061	12,802
Social costs	5,735	6,084	4,947	4,419	4,630
Taxes and charges	505	655	968	731	762
Depreciation and amortization expense	647	833	775	669	784
Depreciated price of sold assets and material	145	86	2,999	1,181	101
Allowance	0	0	0	0	371
Other costs of economic activities	68	89	216	43	50
Total costs of economic activities	78,685	59,313	50,821	57,191	69,856
Sold bonds and shares	2,140	0	0	0	2,873
Other financial costs	500	600	742	643	546
Total costs of financial activities	2,640	600	742	643	3,419
Costs of extraordinary activities	0	0	2	0	0
Total costs	81,325	59,913	51,565	57,834	73,275

TABLE 4 EBIT structure in the period of 2001–2005 (in 1000 SKK)

Income type	2001	2002	2003	2004	2005
Income from economic activities*	−494	701	292	696	−2,105
Income from financial activities*	1,737	−505	−711	−634	3,323
Income from extraordinary activities*	20	44	86	118	47
EBIT	1,263	240	−333	180	1,265

* Before interest and taxes.

caused by company productivity decrease. The company shows a loss in 2003. Since then, EBIT has started to increase step by step and productivity has started to rise. In 2005, EBIT of SKK was only 2000 higher than its amount in 2001. Although the costs (one of the factors influencing profit increase) decreased in 2003, the revenues were reduced as well due to a lower amount of orders. This has negatively influenced the profit level.

Tables 5 and 6 show EBIT changes and the influence of each income type on EBIT in the monitored period.

Percentage of interannual EBIT changes was calculated through horizontal analysis, which calculates the monitored indicators as a ratio of their values in the base year and in the previous year. This method is

TABLE 5 Interannual EBIT changes (in %)

Income (NI) type	2001/2002	2002/2003	2003/2004	2004/2005
EBIT	–81.00	–238.75	154.05	681.67

TABLE 6 Interannual share on EBIT change (in %)

Income type	2001/2002	2002/2003	2003/2004	2004/2005
Income from economic activities*	94.62	–170.42	121.32	–1556.11
Income from financial activities*	–177.51	–85.83	23.12	2198.33
Income from extraordinary activities*	1.90	17.50	9.61	39.44

NOTES * Before interest and taxes.

used to discover eventual long-term trends in each of the income statement and balance sheet elements, as shown in the EBIT indicator. Until 2003, a decreasing trend is noticeable in the indicator's development, as is an increasing trend as of the next year.

The company situation analysis found that company productivity was decreasing in the period of 2001–2003, whereby the company recorded a loss in 2003 and decreased the owners' property value.

Based on the above diagnostic analysis and synthesis, the action plan for productivity increasing was elaborated:

- output level increase;
- expansion of product range;
- costs decrease;
- focus on profit growth;
- marketing investments.

The forecast for costs increase and company productivity (measured

TABLE 7 Total revenues, costs and EBIT in different output types

Output type	Revenues[1]	Costs[1]	Costs[2]	EBIT[1]	EBIT[2]
Goods A	3,430	3,364	98.08	66	1.92
Goods B	10,070	9,755	96.87	315	3.13
Goods C	900	827	91.89	73	8.11
Goods D	3,700	3,330	90.00	370	10.00
Services XY	1,900	1,843	97.00	57	3.00
Average	4	3,823,800	94.77	176,200	5.23

NOTES [1] In 1000 SKK. [2] Percentage.

TABLE 8 Forecast of costs increase and company productivity measured through income at each type of output level increase

Output type	Output increase[1]	Output increase[2]	Costs increase[3]	Costs increase[2]	EBIT increase[3]	EBIT increase[2]
Goods A	2	10,00	7,310,570	9,98	143,430	11,34
Goods B	1	10,00	7,220,831	9,85	233,169	18,43
Goods C	8	10,00	6,849,398	9,35	604,602	47,79
Goods D	2	10,00	6,708,600	9,16	745,400	58,92
Services XY	4	10,00	7,230,380	9,87	223,620	17,68
Average	3	10,00	7,063,956	9,64	390,044	30,83

NOTES [1] Amount. [2] Percentage. [3] In 1000 SKK.

TABLE 9 Comparison of costs of company employee per hour and outsourcing costs

Costs items	Carpenter	Electrician	Locksmith
Total costs per company employee (SKK/hour)	200	240	200
Total costs per person in outsourcing (SKK/hour)	120	160	120
Costs saving per hour (SKK)	80	80	80
Costs saving per hour (%)	40.00	33.33	40.00

through EBIT) was a 10 % output increase and an expansion of product range (table 8). They were expressed in SKK and in %, and compared to 2005 for each output type separately as well as for the average values.

One solution for cost saving can be to outsource supporting activities to external companies (self-employers), which allows for saving of labor costs. Companies specialized in particular activities can do their jobs with lower costs, which is an important outsourcing advantage. Table 9 shows comparison of costs per hour of company employees and outsourcing costs.

Finding suppliers able to offer materials of expected quality at lower prices will influence cost reduction. However, price decrease must not mean quality decrease. It is important to find the best supplier in terms of quality, price and delivery time.

Cost saving can also be achieved through reduction of acquisition costs. This requires that work be well organized to achieve continuous supplies and correctly timed deliveries without wasted time. If possible, it is important to plan in advance activities connected with selecting suppliers and purchasing materials.

As far as labor costs (payload) are concerned, it is important to keep

the right relationship between labor productivity development and average salaries. The average salary should grow more slowly than the work productivity. By increasing productivity, it is possible to achieve labor cost savings.

Increasing profit by raising outcomes prices is only possible in the short-term period. High profit calculated in prices encourages competitors and causes increased supply. Consequently, the growing supply pushes the prices down. In the long term period, it is more suitable to maximize profit by increasing production, which is determined by the market saturation. Costs and profit work in opposition to each other. Cost savings with the same pricing level cause increased profit and vice-versa.

Conclusion

In a world of globalization and information technologies, a company is influenced by new or modified aspects of its environment. These mainly concern customers (raising their needs, decreasing customers' loyalty, etc.), competitors (increasing pressure from the existing ones, creation of new companies, etc.), and time (shorter supply time, shorter innovation cycles).

Significant criteria for a company to succeed and survive on the market include high quality and low costs, which together with good value for customers, flexibility and speed of order fulfilment create a certain standard.

Diagnostics as a science dealing with analysis of company productivity is a precondition for helping the company to succeed in the competitive environment. It is necessary to point out that enterprise diagnostics is not an economic analysis. Enterprise diagnostics includes all relations and connections of the researched economical event; also its evaluation, comparison with testing criteria, valuations of comparison and setting diagnosis and therapy.

Application of the general diagnostic model of company productivity to the net income has pointed to a frequent problem of company practice. This is the problem of profit showing, which is an inevitable precondition for long-term company development and growth. Diagnostic access to company productivity allows the recognition of specific problems in greater detail, which results from the diagnostic nature of each company activity.

In this stage of research there are no actual examples of company pro-

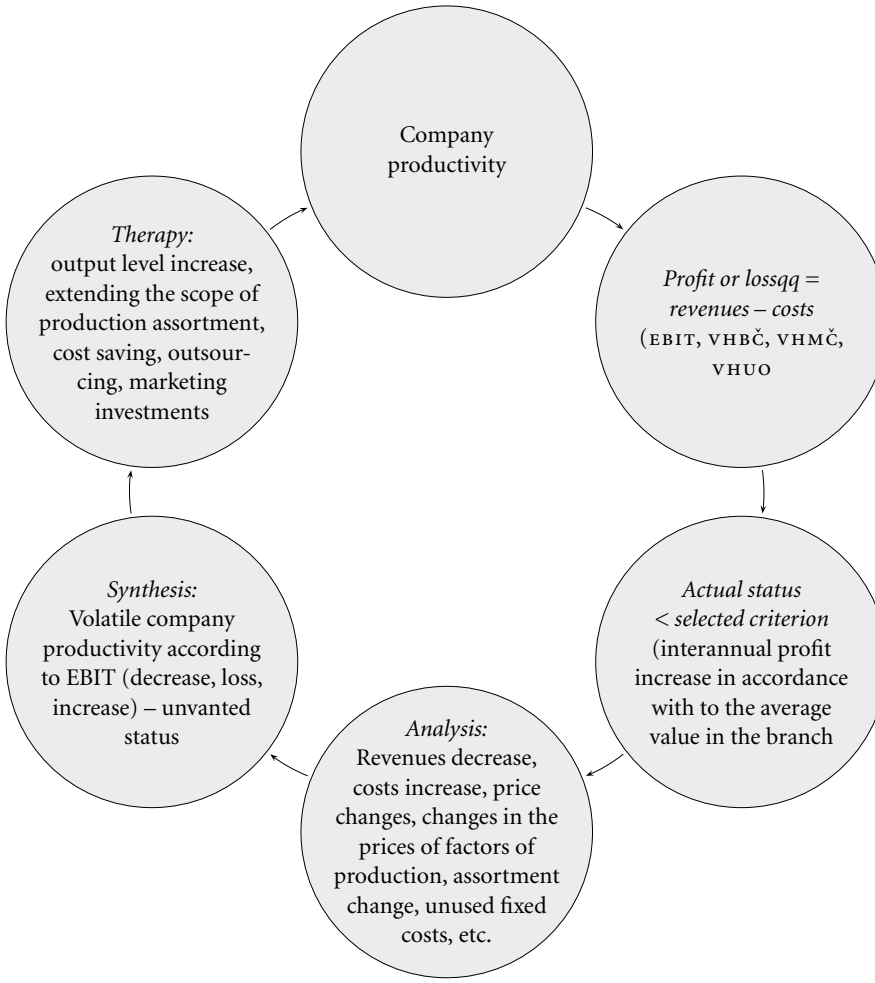

FIGURE 7 Model of company productivity diagnosis

cesses that could be verified with more empirical data assertions, but wider discussions in this area are still continuing, so all views, suggestions or notes are acceptable and shift basic knowledge about enterprise diagnostics on to the qualitatively higher level.

At present the dominant subject dealing with the problematic of enterprise diagnostics is VŠB-TU in Ostrava, that is building on knowledge from the past and cooperating mainly with Faculty of Operation and Economics of Transport and Communications, University of Žilina and also with Akademia Ekonomiczna in Krakow, and universities in

Bratislava. The authors dealing with this topic also publish the results of research at international conferences, which are organized by Faculty of Operation and Economics of Transport and Communications University of Žilina over a two-year period.

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