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ECONOMIC EFFICIENCY OF REAL SECTOR COMPANIES – NATURE, TYPES, ELEMENTS, INDICATORS AND MODELS

This paper includes an introduction, four parts and a conclusion. It presents a survey focused on the economic efficiency of real sector companies, i. e. the companies operating in the segments of production, trading and services.

The presented research work is based on the Bulgarian legal framework regulating the elements of economic efficiency of companies and the economic efficiency itself. The elements represent useful results (economic effects) such as net sales revenue, total income, sale and corporate profits and corporate expenses and resources (assets, capital and personnel) employed in their realization.

The discussed issue is topical and important as the use of corporate resources and incurred corporate expenses are directly related to the useful results generated through such resources and expenses. So, companies may analyze, plan, control and seek options to optimize their economic efficiency.

The presentation of economic efficiency in terms of the Bulgarian legislation is based on information reported in the financial statements and certain accounts of companies. As we know, the Commercial Register is freely accessed, so experts at a given company may study the efficiency of their competitors using data presented in their financial statements published in the said Register. That access allows lecturers, analysts, consultants and other professionals to study the economic efficiency of other companies. They may use the indicators and models presented in this work as well.

JEL: L20; M20

Introduction

In the conditions of the market economy, economic efficiency represents a material aspect of the economic activities of real sector companies. It is related to their useful results (economic effects) and expenses or resources (assets, capital or personnel) employed in the realization of such results. This economic efficiency study focuses on income and profits as they are effects playing a crucial role. There are a number of economic efficiency concepts. This paper, however, presents it as an economic effect realized through employing a unit of

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resources or expenses, i. e. in terms of the Bulgarian legislation regulating the efficiency elements. As mentioned, these are the economic effects such as income and profits and expenses and resources employed in their realization.

Economic efficiency may be divided into four types – capital efficiency, asset efficiency, personnel efficiency and cost-efficiency. The indicators used to measure, analyze, plan and control the economic efficiency of companies are indicators measuring the use and allocation of their resources and expenses to a great extent. In other words, this is the benefits to victims ratio that summarizes the indicators measuring economic efficiency. They also allow assessment of the functioning of companies in the conditions of competition and of their management.

This work focuses on the indicators measuring economic efficiency and models where they are included in addition to other indicators. We do not study the efficiency analysis, planning and control as this requires a research work of a considerably greater volume. We only state that these indicators and models may be used to analyze, plan and control economic efficiency.

In our opinion, the discussed issue has a material importance to company owners as it directly relates to their interests, so they should pay a particular attention in that respect as economic effects are realized through employing certain expenses, which means a reduction of equity (the owners' capital that is available to a company). Moreover, economic effects require corporate resources controlled by the owners. So, the owners or the management body appointed by the owners manage company resources in a way ensuring the satisfaction of their interests, generation of satisfactory profit in particular. Corporate income and profits represent equity increases, while efficiency figures show the income or profits (equity increases) realized through employing a unit of expenses or a unit of resources.

The study object is the economic efficiency of real sector companies (capital efficiency, asset efficiency, personnel efficiency and cost efficiency), while the study subject covers the elements and indicators used for its measurement. The subject also includes models measuring the economic efficiency developed by us in line with the popular DuPont Model. The study subject is discussed in terms of the Bulgarian legal framework regulating the elements of economic efficiency (income, profits, assets, capital, personnel and expenses) and the economic efficiency itself.

According to the study thesis, the definitions of the elements of the economic efficiency of real sector companies given in the Bulgarian legislation provide options to improve the analysis, planning and control of that efficiency. In fact, these legal definitions form the framework for studying the economic efficiency on a theoretical level, which directly affects practice as companies report the information about these elements in line with the said definitions. This paper presents such options. In our opinion, the knowledge and application of them by the management bodies of real sector companies is a prerequisite for more thorough efficiency analysis, planning and control. In the conditions of strong market competition, companies should pay a particular attention to economic efficiency as it measures the useful results generated through a unit of expenses or unit of resources.

The study objective is to present the indicators and models used to plan, analyze and control the economic efficiency of certain types of expenses, capital, assets and personnel. The presented three models are totalities of economic efficiency indicators and are in line with the DuPont Analysis. The application of the presented indicators and models by the management bodies of real sector companies allows them to seek and find options for economic efficiency optimization.

The objective covers the following tasks:

1. Presentation of the legal definitions (as specified in the legal framework) of the economic efficiency elements and their explanation.

2. Study of the nature of economic efficiency of real sector companies in terms of the Bulgarian legislation regulating such elements through indicators measuring capital efficiency, asset efficiency, personnel efficiency and cost efficiency.

3. Clarification of the presented indicators and models of indicators in terms of the interests of companies and their owners and personnel.

4. Substantiation of the necessity of thorough knowledge of the aspects of economic efficiency by company experts involved in its measurement, analysis, planning and control.

This paper is based on traditional research methods such as analysis, synthesis, induction and deduction and the logical, systematic, comparative and regulatory approaches.

The following restrictions apply to this paper:

- It does not discuss the analysis, planning and control of the economic efficiency of real sector companies as this requires a research work of a considerably greater volume.

- It presents only a study of the economic efficiency nature and related types, elements, indicators and models that represent totalities of indicators.

- It summarizes the economic efficiency concepts, but the study is in line with the Bulgarian legislation regulating the elements of economic efficiency. Thus, companies may apply the efficiency types and measurement indicators and models presented in this work. Economic efficiency is not studied in terms outside the Bulgarian legal framework.

In our opinion, this work will be useful to company managers and experts dealing with the aspects of economic efficiency and research professionals interested in such aspects.

Part One. Nature of the economic efficiency. Types and elements of the economic efficiency and applicable legislation

We will present a brief description of various theoretical concepts of economic efficiency followed by its explanation in terms of the Bulgarian legislation, which allows practical work, i. e. measurement, planning, analysis and control of company efficiency, using relevant indicators.

In the remote past, the famous Bulgarian economist Dimitar Dobrev published a book (1941) stating that "each management ability will be a relative correlation of two comparable values – the usefulness value and the victim-giving value:

$$Management\ ability\ = \frac{Benefits}{Victims}$$

Such correlation may be static (profit to capital ratio) or dynamic (revenue to expenses ratio)".

Over the following decades, the term "management ability" was replaced by the term "economic efficiency" as it did not establish itself as a theoretical or practical concept. In the past, National Accounting Standard 13. Indicators for Financial and Accounting Analysis, including certain indicators measuring the economic efficiency, applied. However, it was repealed.

It should be noted that there exist, theoretically and practically, terms such as social efficiency, social and economic efficiency, technical efficiency, ecological efficiency, tourism efficiency, health care efficiency and others in addition to economic efficiency. However, this work covers economic efficiency only.

A number of authors have discussed the aspects of economic efficiency, including Hatry & Fisk (1971), Pidley & Simon (1938), (1971), Astahov (1975), Holland (1983), Angelov (1986), Ahanov (1987), Barilenko (1990), Soul (1990), Behrens & Hawranek (1991), Kr. Georgieva (1991), G. Raykov (1996), D. Pol (1998), Body (2000), Ivanova & Todorov (2008) and others. In his research work published at the end of the last century (1999) in the USA, Stephan Loh studies the relationship between economic efficiency and economic indicators such as interest rate, inflation rate, performance growth rate, etc. and develops a theory of economic efficiency relating economic efficiency to the indicators that measure it.

We will also discuss some authors who published works studying the economic efficiency over the current century. According to Prof. Statev (2011), it represents "a dependence between the consumption of the limited factors of production and the satisfied needs with the goods produced by them – with minimum costs to satisfy maximum needs". He also presents several types of economic efficiency and states that "an ideal economic efficiency only exists in a theoretical model predominated by perfect competition".

In the opinion of authors such as K. Mitov, R. Koleva, M. Gergova and G. Doncheva (2012), efficiency is based on the juxtaposing of benefits and expenses that presupposes commensuration of generated results against used resources.

In their work Evaluation of Economic Effectiveness of the State Purchases System: Criteria and Priorities (2017), Aleksey Bogoviz, Yulia Ragulina and others discuss the economic efficiency on a national level, the efficiency of state purchases in modern Russia in particular.

In their study focused on the efficiency of real estate companies in Malaysia (2019), Abdullah, Maamor and Karim use the contemporary Data Envelopment Analysis (DEA) and the Tobit Model and present the analysis of the efficiency of 67 real estate companies listed on the Kuala Lumpur Stock Exchange.

An Encyclopædia Britannica article (www.britannica.com/topic/efficiency-economics-and-organizational-analysis) states the following: Efficiency, in economics and organizational analysis, a measure of the input a system requires to achieve a specified output. A system that uses few resources to achieve its goals is efficient, in contrast to one that wastes much of its input".

Many companies in Bulgaria and around the world apply the International Accounting Standards (IAS), which are accompanied by the Framework for the Preparation and Presentation of Financial Statements issued in July 1989 by the International Accounting Standards Committee (IASC) transformed into the International Accounting Standards Board (IASB) at a later stage. The IAS and the Framework are issued in Bulgarian by the Institute of Certified Public Accountants. Their translated texts have been published by ForCom (1999). In accordance with Paragraph 17 of the Framework for the Preparation and Presentation of Financial Statements (1999), "Information about the performance of an entity, in particular its profitability, is required in order to assess potential changes in the economic resources that it is likely to control in the future. Information about variability of performance is important in this respect. Information about performance is useful in predicting the capacity of the entity to generate cash flows from its existing resource base. It is also useful in forming judgments about the effectiveness with which the entity might employ additional resources". In accordance with Paragraph 69 of the Framework, "Profit is frequently used as a measure of performance...".

The net sales revenue, sales profit, total income and final financial result (corporate profit) are economic effects of material importance to real sector companies.

Further, in this paper, we discuss the economic efficiency of real sector companies in terms of the Bulgarian legal framework (allowing its measurement, analysis, etc., as mentioned).

Economic efficiency is a useful result, realized through employing a unit of expenses or a unit of resources (average availability). The values of such efficiency are calculated using the economic effect to expenses and economic effect to resources (capital, assets and personnel) correlations. However, it defines the elements of economic efficiency, including the economic effects (income and profits) and the resources (equity, assets and personnel) employed in their realization. As to resources, borrowed capital and total capital are also discussed further in this paper. The Bulgarian legislation also gives a definition for expenses (as an economic efficiency element) that are employed to realize certain effects.

In particular, the National Accounting Standards (NAS) and the General Provisions thereto became effective on 1 January 2005. They were adopted by Decree No 46 of the Council of Ministers dated 21 March 2005 and amended later (2007, 2016). The NAS General Provisions provide for definitions (legal definitions) of the elements of economic efficiency, including income, sales profit and corporate profit, assets, equity and borrowed capital (in fact, the definition is for liabilities, but they are forms of that capital). We do not mention these definitions in the study, as we believe it is not a problem for readers to get acquainted with them.

It is a financial concept of equity provided for in the framework for the Preparation and Presentation of Financial Statements issued by IASC (present name: IASB). In accordance

with Paragraph 102 of that Framework, "Under a financial concept of capital, such as invested money or invested purchasing power, capital is synonymous with the net assets or equity of the entity". In other words, equity is money invested in a company by its owners and used by such company, while some assets represent manners of spending or a pecuniary form of such equity.

In the context of that financial concept, borrowed capital may be regarded as money invested in a company by non-owners (bondholders, etc.) and used by such company, while some assets represent forms of spending such capital.

Personnel is also an element of the economic efficiency of a company. In the Methodology for Calculation of the Average Number of Employees as per list approved by the National Statistical Institute (NSI) with NSI Chairman Order No РД 07-21 dated 31 March 2007 defines "number of employees as per list" and "average number of employees as per list."

In general, the Law on Accountancy, the NAS and the IAS cover a number of issues relating to income, expenses and other economic efficiency elements. The Law on Accountancy, the Government Decrees on NAS and the European Union (EU) Regulations on IAS constitute the legal framework for the economic efficiency discussed in this paper.
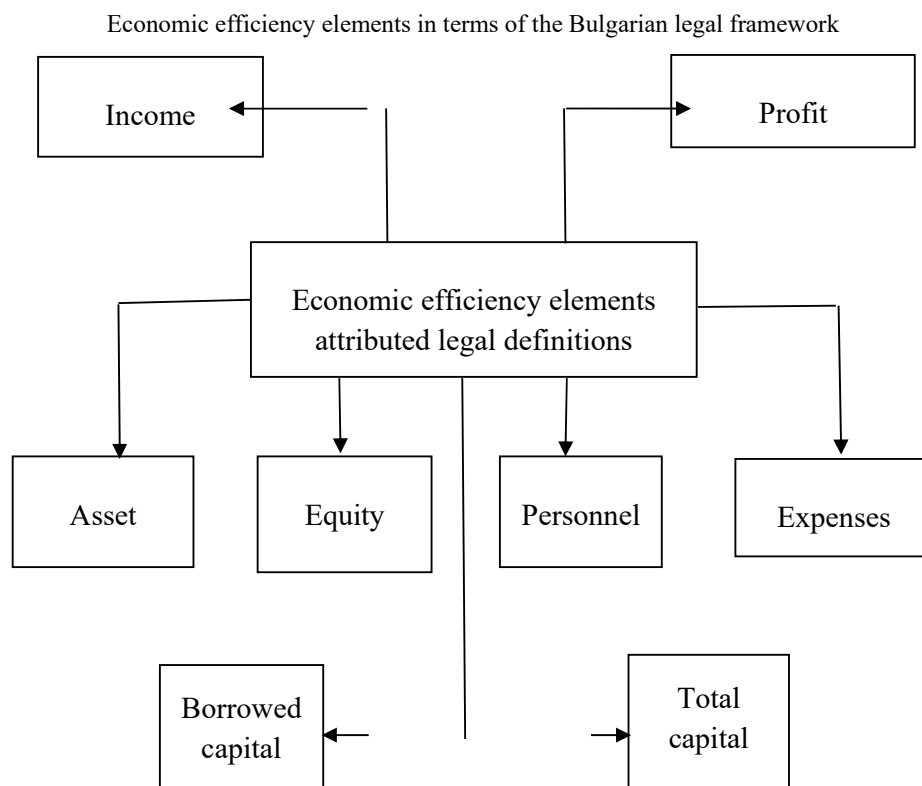
These Regulations are binding legislative acts, which are to be applied by all EU Members States. Illustration of the elements of economic efficiency and their legal definitions (Figure 1.).

The figure below presents economic efficiency in terms of the Bulgarian legislation and we consider it a solid argument to discuss the aspects of economic efficiency of real sector companies on such basis (Figure 2.).

The correlation measuring capital efficiency uses the average carrying amount of equity, borrowed capital or total capital (equity + borrowed capital). The correlation measuring asset efficiency uses the average carrying amount of different assets (that will be presented when discussing the indicators measuring asset efficiency). It is clarified that the average carrying amounts of capital and assets are calculated through dividing the total of respective carrying amounts at the beginning and at the end of the period by 2. The correlation measuring personnel efficiency uses the average number of employees as per list calculated in accordance with the Methodology for Calculation of the Average Number of Employees as per List.

The economic effects such as net sales revenue, total income, sales profit and corporate profit and the capital, assets, personnel and expenses employed in their realization are reported in the annual financial statements. They constitute a source of information when presenting the economic efficiency. The accounts that report the effects, expenses and resources (excluding personnel, which is accounted for through specific documents) also constitute sources of information.

Figure 1

Economic efficiency elements in terms of the Bulgarian legal framework

| Income |

| Profit |

| Economic efficiency elements attributed legal definitions |

| Asset | | Equity | | Personnel | | Expenses |

| Borrowed capital |

| Total capital |

Note: Borrowed capital represents liabilities and equals their total amount. Hence, that concept of borrowed capital is closely related to the liability legal definition.
Total capital equals the sum of equity and borrowed capital (liabilities). That definition is closely related to the equity and liability legal definitions.
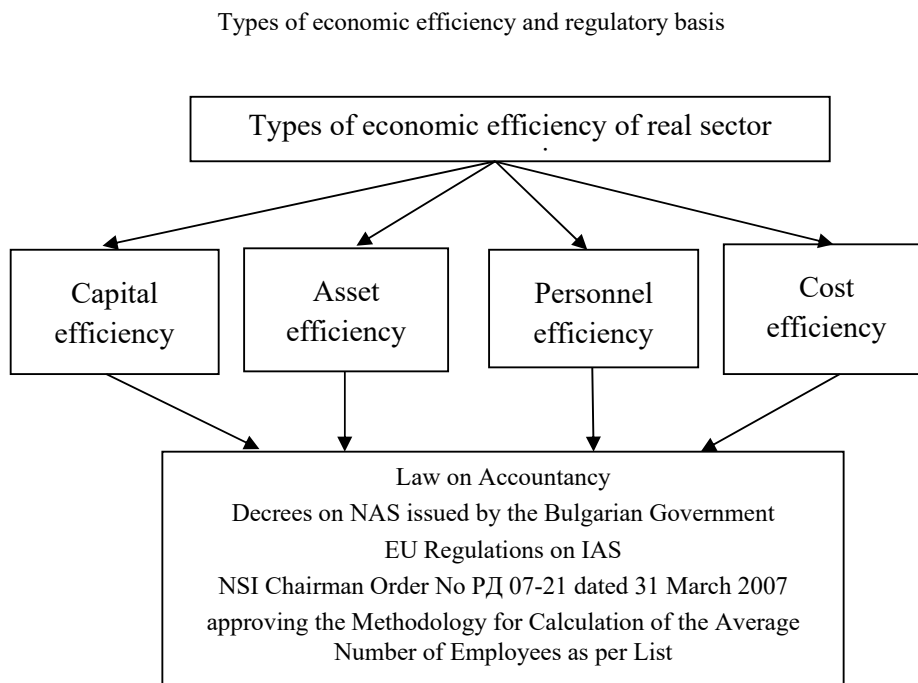
Figure 2

Types of economic efficiency and regulatory basis

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┌─────────────────────────────────────────────────┐
│      Types of economic efficiency of real sector │
└─────────────────────────────────────────────────┘

┌──────────┐  ┌──────────┐  ┌──────────┐  ┌──────────┐
│ Capital  │  │  Asset   │  │Personnel │  │   Cost   │
│efficiency│  │efficiency│  │efficiency│  │efficiency│
└──────────┘  └──────────┘  └──────────┘  └──────────┘

┌─────────────────────────────────────────────────┐
│               Law on Accountancy                 │
│   Decrees on NAS issued by the Bulgarian         │
│                  Government                       │
│              EU Regulations on IAS               │
│   NSI Chairman Order No РД 07-21 dated 31 March   │
│                     2007                          │
│   approving the Methodology for Calculation of    │
│         the Average Number of Employees          │
│                  as per List                      │
└─────────────────────────────────────────────────┘
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Figure 3 shows the relation between the types of economic efficiency and the elements of economic efficiency used in the economic efficiency correlations and the indicators that are specific expressions of such correlations.

The correlation measuring capital efficiency uses the average carrying amount of equity, borrowed capital or total capital (equity + borrowed capital). The correlation measuring asset efficiency uses the average carrying amount of different assets (that will be presented when discussing the indicators measuring asset efficiency). It is clarified that the average carrying amounts of capital and assets are calculated through dividing the total of respective carrying amounts at the beginning and at the end of the period by 2. The correlation measuring personnel efficiency uses the average number of employees as per list calculated in accordance with the Methodology for Calculation of the Average Number of Employees as per List.

Figure 3

Types of and correlations and indicators measuring the economic efficiency of real sector companies in terms of the Bulgarian legislation

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                    ┌──────────────────────────┐
                    │  Types of the economic   │
              ┌─────│ efficiency of real sector│──────┐
              │     └──────┬────────────┬──────┘      │
              │            │            │             │
              ▼            ▼            ▼             ▼
       ┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────────┐
       │ Capital  │ │  Asset   │ │Personnel │ │   Cost   │
       │efficiency│ │efficiency│ │efficiency│ │efficiency│
       └────┬─────┘ └────┬─────┘ └────┬─────┘ └────┬─────┘
            │            │            │            │
            ▼            ▼            ▼            ▼
    ┌──────────┐ ┌──────────┐ ┌──────────┐ ┌──────────────┐
    │ Economic │ │ Economic │ │ Economic │ │Economic effect│
    │  effect  │ │  effect  │ │  effect  │ │ ------------- │
    │----------│ │----------│ │----------│ │      ---      │
    └────▲─────┘ └────▲─────┘ └────▲─────┘ └──────▲───────┘
         │            │            │              │
         │     ┌──────┴────────────┴──────┐       │
         └─────│  Correlations used to    │───────┘
               │ measure the economic     │
               │  efficiency of           │
               └────────────┬─────────────┘
                            │
                            ▼
            ┌───────────────────────────────────────┐
            │ Indicators used to measure, analyze,  │
            │   plan and control the economic       │
            │ efficiency of real sector companies   │
            └───────────────────────────────────────┘
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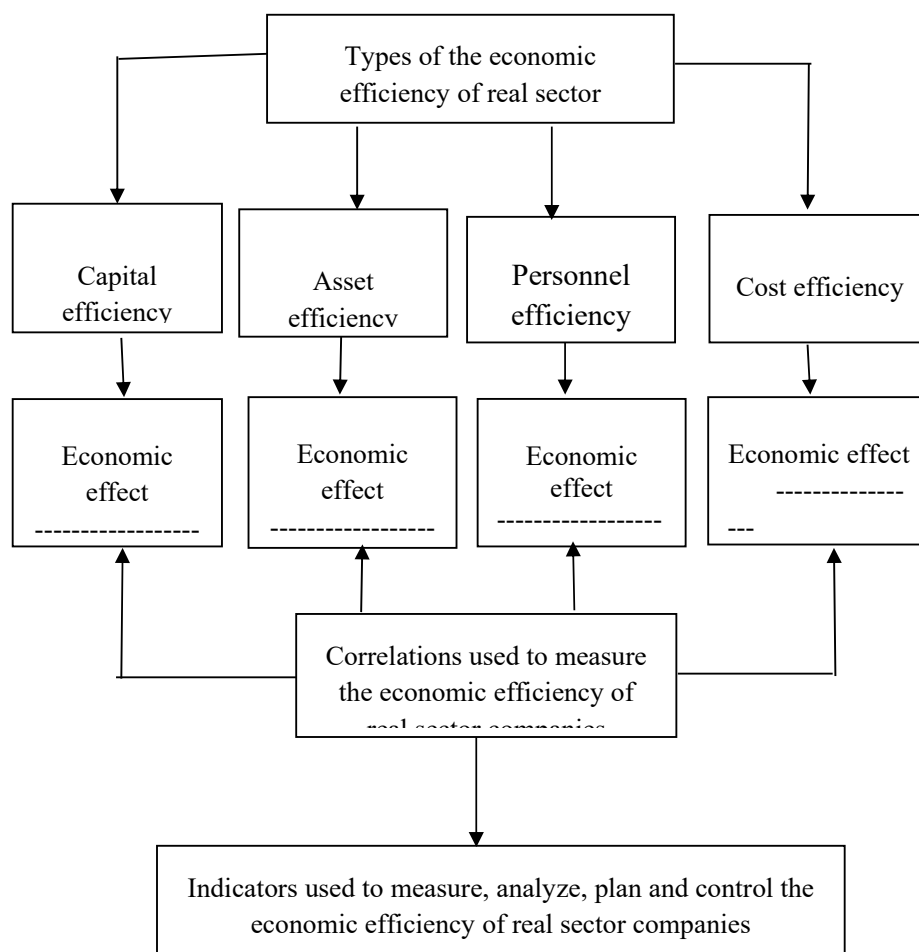
The economic effects in the formulas used to calculate the indicators measuring economic efficiency are described further in this work.

Economic effects include the corporate profit (useful result) that represents the final operating result of a company for a particular period, the corporate income that equals the total of all revenues realized over a particular period, the net revenue from sales of finished

products (typical to industrial companies that create and sell finished products), the net revenue from sales of goods (generated by commercial companies that buy and sell products used as means of payment that are treated as goods) and the net revenue from sales of services (realized by companies operating in the segment of services, including transportation, repairs and others, that create and sell services, i. e. non-material finished products).

The main activities performed by industrial and commercial companies and service providers represent industrial, commercial and services creation respectively. That should be considered as some indicators presented below concerns such main activities. In practice, companies generate the net sales revenue, which usually occupies the biggest relative share of their total income, through their main activities.

The profit from sales of finished products is the economic effect representing the positive difference between the net revenue from sales of finished products realized over a particular period and the related total expenses reported for the same period. The total expenses include the cost (and/or other value) of the finished products sold, the administrative expenses and the direct expenses related to sales for the same period. Finished products are valued at cost (the expenses employed in their realization) and include total expenses, if sold. However, they may remain unsold over a particular period where they are subject to revaluation in accordance with the applicable accounting standards. As a result, finished products may be attributed to a value that differs from their cost. That value is included in the total expenses following the sale realization. There is also a scenario where a portion of the finished products is sold at cost and another – at another value over the same period. Formulas used to calculate the profit from sales of finished products:

$$
\begin{aligned}
Profit\ from\ sales\ of\ finished\ products =\\
= Net\ revenue\ from\ sales\ of\ finished\ products\\
- Total\ expenses\ relating\ to\ finished\ products
\end{aligned}
$$

$$
\begin{aligned}
Profit\ from\ sales\ of\ finished\ products =\\
= Net\ revenue\ from\ sales\ of\ finished\ products\\
- (Cost\ and/or\ other\ value\ of\ finished\ products\ sold\\
+ Administrative\ expenses\\
+ Direct\ expenses\ relating\ to\ sales\ of\ finished\ products)
\end{aligned}
$$

Commercial companies generate an economic effect in the form of profit from the sales of goods. It is the positive difference between the net revenue from sales of goods and the total expenses, i. e. the total expenses relating to the goods sold, over the same period. They include the carrying amounts of goods sold, the cost of commercial activity (expenses employed in commercial operations) and the administrative expenses over the same period. Formulas used to calculate the profit from sales of goods:

$$Profit\ from\ sales\ of\ goods =$$
$$= Net\ revenue\ from\ sales\ of\ goods$$
$$- Total\ expenses\ relating\ to\ goods$$

$$Profit\ from\ sales\ of\ goods =$$
$$= Net\ revenue\ from\ sales\ of\ goods$$
$$- (Carrying\ amount\ of\ goods\ sold$$
$$+ Cost\ of\ commercial\ activity + Administrative\ expenses)$$

Companies in the sector of services generate an economic effect in the form of profit from sales of services. It is the positive difference between the net revenue from sales of services and the total expenses, i. e. the total expenses relating to the services sold, over the same period. They include the carrying amounts of services sold (the expenses employed in their creation), the administrative expenses and the direct expenses relating to the sale of services over the same period. Formulas used to calculate the profit from sales of services:

$$Profit\ from\ sales\ of\ services = Net\ revenue\ from\ sales\ of\ services -$$
$$Total\ expenses\ relating\ to\ services$$

$$Profit\ from\ sales\ of\ services = Net\ revenue\ from\ sales\ of\ services -$$
$$(Cost\ of\ services\ sold + Administrative\ expenses +$$
$$Direct\ expenses\ relating\ to\ sale\ of\ services)$$

Where a company carries out all of the aforementioned activities (industrial, commercial and provision of services), the administrative expenses over a particular period should be allocated in a specific manner when calculating the profit types based on a criterion such as the relative sales share of their total amount. Example: if the net profit from sales of finished products, of goods and of services form respective relative shares of 40%, 35% and 25% of the total net revenue from sales over a particular period, the administrative expenses for the same period should be allocated in the following manner: 40%, 35% and 25% of them are included in the calculation of the total expenses relating to the finished products, goods and services sold.

The sales profit affects the corporate profit (final financial result) as it is one of its forming factors. The formula, used to calculate the corporate profit:

$$Corporate\ profit\ = (Sales\ profit\ + Financial\ income) - (Financial\ expenses\ +$$
$$Tax\ expenses)$$

In other words, four key factors affect the corporate profit. One of these factors is the sales profit whose increase or decrease result in a higher or lower value of the corporate profit, respectively. In most case, the sales profit reports the highest value compared to the other three factors. Hence, it plays a crucial role as to the formation of corporate profit.

Where a company realizes two or three types of such profit, they are used in the calculation of corporate profit.

Part Two. Resource efficiency

Resource efficiency is calculated through the economic effect on resources correlation. The indicators that are specific expressions of such correlation are given further in this paper. Let us start with the indicators measuring equity efficiency:

$$
\begin{aligned}
&Ratio\ of\ equity\ \ efficiency \\
&\quad taking\ into\ account\ corporate\ income
\end{aligned}
= \frac{Corporate\ income}{Equity} \qquad (1)
$$

$$
\begin{aligned}
&Ratio\ of\ equity\ \ efficiency \\
&taking\ into\ account\ corporate\ profit
\end{aligned}
= \frac{Corporate\ profit}{Equity} \qquad (2)
$$

As this work discusses a number of efficiency indicators, we consider it sufficient to present these two indicators calculated through the corporate income and profit as summarizing economic effects.

Taking into account corporate income or profit means that the ratios are calculated using them as economic effects.

The formula used to calculate indicator 1 includes the total corporate income over a particular period as a numerator, while the formula used to calculate indicator 2 includes the corporate profit over a particular period (the positive difference between the corporate income and expenses) as a numerator.

Both formulas use the average carrying amount of equity for the period, over which the economic effects are realized, as denominator – it is calculated through dividing the total of such amounts at the beginning and at the end of the period by 2.

These indicators are based on correlations of certain economic effects to equity, which represents an item of resources employed in the realization of such effects. The indicator figures show the effect values realized through average capital of BGN 1 (these indicators may be calculated in other currencies such as EUR or USD).

The increase in equity efficiency is directly related to the interests of company owners as average equity of BGN 1 is employed in the realization of higher-value effects (income and profits) that represent increases in the capital held by owners. In other words, the average equity of BGN 1 is employed in the realization of a higher equity increase over a particular period compared to the proceeding one.

The assets equaling the equity amount represent manners of spending or a pecuniary form of such equity. These assets may be defined as equity-funded. Respectively, the values of equity efficiency indicators for a particular period show the corresponding economic effects realized through employing average equity of BGN 1 or average equity-funded assets of BGN 1. These indicators also show the effects realized through using assets controlled by the average equity of BGN 1. In other words, there is an equity ratio (calculated through the correlation of the average assets and average equity for a particular period) that shows the average assets per average equity of BGN 1, i. e. the assets controlled by (the holder of)

average equity of BGN 1. What is the reason? Assets are generally resources controlled by a company. Specifically, they are under the control of company owners, i. e. the equity holders. Owners manage the assets directly where they participate in the company operational management or indirectly where they have appointed a management body that deals with these assets. Hence, equity holders control the assets of a company in the capacity of owners and the equity ratio shows the average assets controlled by (the holder of) average equity of BGN 1.

So, if the equity efficiency ratio (taking into account the corporate income) is 1.25 for a particular period, the average equity of BGN 1 is employed in the realization of income of BGN 1.25. But an equity ratio (assets to equity) of 1.90 for the same period means that average equity of BGN 1 controls average assets of BGN 1.90 or average assets of BGN 1.90 controlled by average equity of BGN 1 are employed in the realization of income of BGN 1.25. As demonstrated, there is a difference between equity-funded assets (the assets equaling the equity amount) and assets controlled by equity holders (the total company assets). The above presentation of equity efficiency indicators may be illustrated as follows in Figure 4.

Figure 4

Meaning of the values of equity efficiency indicators
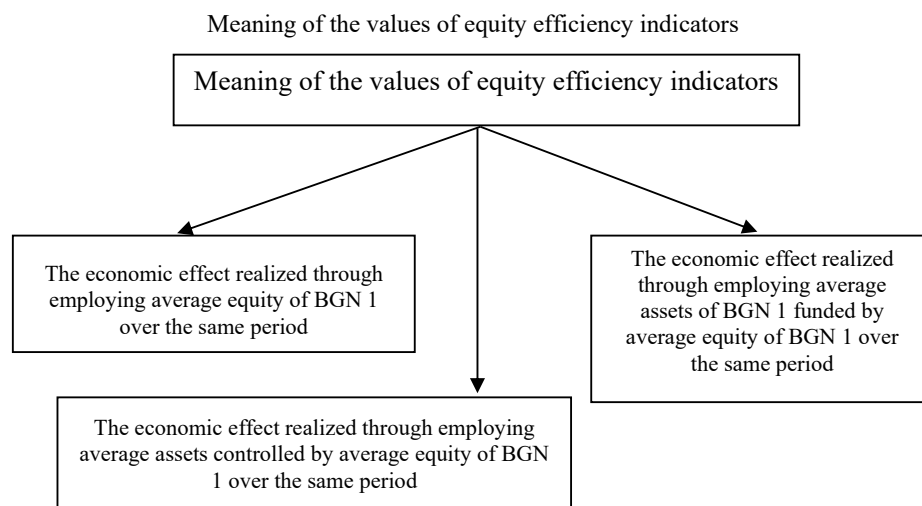
A brief clarification of company owners is given below. It is known that the owner of a piece of property has the right to take discretionary actions as to such ownership. As to company owners (equity holders), they may act in relation to the company at own discretion. They elect the company management body and make decisions on profit allocation and a number of other material corporate issues. In other words, the company is a field of discretionary actions for equity holders in their capacity of owners.

Borrowed capital efficiency is the economic effect realized through employing average borrowed capital of BGN 1 over the same period. Where income and profits are used as economic effects, the borrowed capital efficiency represents an equity increase employing average borrowed capital of BGN 1.

<p align="center">******************</p>

Some of the indicators measuring borrowed capital efficiency are as follows:

$$\text{Ratio of borrowed capital efficiency,}\atop\text{taking into account corporate income} = \frac{Corporate\ income}{Borrowed\ capital} \qquad (3)$$

$$\text{Ratio of borrowed capital efficiency,}\atop\text{taking into account corporate profit} = \frac{Corporate\ profit}{Borrowed\ capital} \qquad (4)$$

There are many other indicators measuring borrowed capital efficiency, but we consider these sufficient for the purposes of this work.

Similar to the calculation of equity efficiency indicators, the ratios of borrowed capital efficiency are calculated, taking into account the corporate income and profit as economic effects.

The formulas use the average carrying amount of borrowed capital for the period, representing the value calculated through dividing the total of its values at the beginning and at the end of the period by 2, as a denominator. The carrying amount of borrowed capital is the total of company liabilities at the beginning and at the end of a particular period, respectively.

We will not discuss net sales revenue and sales profit as they are clarified in the presentation of equity efficiency indicators.

The increase in borrowed capital efficiency for a particular period is in the interest of owners as this means that average borrowed capital of BGN 1 is employed in the realization of greater effect – a higher-value corporate income or profit for such period compared to the preceding one. In other words, average borrowed capital of BGN 1 is employed in the realization of a higher equity increase compared to the preceding period.

The following figure illustrates the correlation of capital, assets and indicators measuring capital efficiency that show the economic effects realized through employing average capital of BGN 1 and average capital-funded assets of BGN 1 respectively (see Figure 5).

Total capital efficiency is the economic effect realized through employing average total capital of BGN 1 over the same period. Where such effects are the income and profits, it may be defined as an equity increase realized through employing average total capital of BGN 1 over a particular period.

Figure 5

Capital efficiency and efficiency of capital-funded assets

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                    ┌─────────────────────────────┐
                    │      Capital and assets      │
                    └─────────────────────────────┘
        ┌───────────────────────┐     ┌───────────────────────────────┐
        │         Equity        │     │  Manners of equity spending   │
        │   Money invested in a │────▶│  Assets equaling the equity   │
        │  company by its owners│     │            amount             │
        └───────────────────────┘     └───────────────────────────────┘
        ┌───────────────────────┐     ┌───────────────────────────────┐
        │    Borrowed capital   │     │   Manners of borrowed capital │
        │   Money invested in a │────▶│            spending           │
        │ company by non-owners │     │   Assets equaling the borrowed│
        │                       │     │         capital amount        │
        └───────────────────────┘     └───────────────────────────────┘
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The equity efficiency indicators show the economic effect realized through employing average equity of BGN 1 or average assets of BGN 1 funded by average equity of BGN 1.

The borrowed capital efficiency indicators show the economic effect realized through employing average borrowed capital of BGN 1 or average assets of BGN 1 funded by average borrowed capital of BGN 1.

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The indicators measuring total capital (equity + borrowed capital) efficiency are generally the same as those measuring equity efficiency and borrowed capital efficiency:

Ratio of total capital,
*   taking into account corporate income* $= \dfrac{Corporate\ income}{Total\ capital}$ (5)

Ratio of total capital,
taking into account corporate profit $= \dfrac{Corporate\ profit}{Total\ capital}$ (6)

These formulas use the average carrying amount of total capital (calculated through dividing the total of its values at the beginning and at the end of the period by 2) as a denominator.

Total capital equals the sum of equity and borrowed capital. However, a company may avail with other forms of capital such as financing and/or deferred income. In such case, they are included in the calculation of total capital.

The increase in total capital efficiency for a particular period is in the interest of owners as this means that average total capital of BGN 1 is employed in the realization of greater effect – a higher equity increase for such period compared to the preceding one.

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Asset efficiency is the economic effect realized through employing average assets of BGN 1 over the same period. In other words, it represents an equity increase employing average assets of BGN 1 over a particular period.

Some of the indicators measuring asset efficiency, in particular, that of fixed assets (FA), tangible fixed assets (TFA) and current tangible assets (TCA) such as raw materials, finished products and goods, using the total income, corporate profit, net sales revenue and sales profit as economic effects, are:

Ratio of FA efficiency, taking into account total income $= \dfrac{Total\ income}{Fixed\ assets}$ (7)

Ratio of FA efficiency, taking into account corporate profit $= \dfrac{Corporate\ profit}{Fixed\ assets}$ (8)

Ratio of efficiency of TFA used in the course of ordinary activity,
    taking into account net sales revenue $= \dfrac{Net\ sales\ revenue}{TFA\ used\ in\ the\ course\ of\ ordinary\ activity}$ (9)

Ratio of efficiency of TFA used in the course of ordinary activity, taking into account sales profit $= \dfrac{Sales\ profit}{TFA\ used\ in\ the\ course\ of\ ordinary\ activi}$ (10)

Ratio of efficiency of raw materials $= \dfrac{Net\ revenue\ from\ sales\ of\ finished\ products}{Raw\ materials}$ (11)

Ratio of efficiency of raw materials, $= \dfrac{Profit\ from\ sales\ of\ finished\ products}{Raw\ materials}$ (12)

Ratio of efficiency of finished products, taking into account net revenue from sales of finished products $= \dfrac{Net\ revenue\ from\ sales\ of\ finished\ products}{Finished\ products}$ (13)

Ratio of efficiency of finished products, taking into account profit from sales of finished products	$= \dfrac{Profit\ from\ sales\ of\ finished\ products}{Finished\ products}$	(14)
Ratio of efficiency of goods, taking into account net revenue from sales of goods	$= \dfrac{Net\ revenue\ from\ sales\ of\ goods}{Goods}$	(15)
Ratio of efficiency of goods taking into account profit from sales of goods	$= \dfrac{Profit\ from\ sales\ of\ goods}{Goods}$	(16)

Note: The average carrying amounts of respective assets are used as denominators.
Ratios are calculated on the basis of various economic effects, i.e. taking into account such effects –
for example: taking into account sales revenue or sales profit.

The formula used to calculate indicator 9 includes the total of net revenue from sales of finished products, net revenue from sales of goods and net revenue from sales of services (where a company realizes all of them) as a numerator and the average carrying amount of TFA, employed in the three main activities (industrial, commercial and provision of services), as a denominator. Where a company reports two of these types of net revenue, their total is used as numerator and the average carrying amount of TFA, employed in the respective two activities, as a denominator. Similarly, if only one type of net revenue is realized, the formula uses only its value and the average carrying amount of TFA employed in the particular main activity.

The same logic applies to the nominator and denominator of the formula calculating indicator 10. The nominator includes the total of the three types of sales profit or two or one of them, while the denominator includes the carrying amounts as presented in relation to indicator 9.

As mentioned, the main activity of a company is the one generating the biggest relative share of its total income. A company may carry out two or more main activities – industrial and commercial, industrial and repair, construction and assembly and/or agricultural.

Industrial companies may use indicators 11 through 14. It should be noted that raw materials form the material substance of finished products (there are also secondary materials and others).

The increase in asset efficiency for a particular period is in the interest of owners as this means that average assets of BGN 1 are employed in the realization of a higher equity increase for such period compared to the preceding one.

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Personnel efficiency is the economic effect realized through employing average personnel of one person over the same period, i. e. average personnel of one person of all personnel members or average personnel of one person of all key personnel (personnel involved in the main activity) members. Where corporate income and profits are used as economic effects, such efficiency represents an equity increase employing average personnel of one person.

Some of the indicators measuring personnel efficiency, using corporate profit, total income, sales profit and net sales revenue as economic effects, are:

$$\begin{matrix} \textit{Ratio of personnel efficiency,} \\ \textit{taking into account} \\ \textit{corporate income} \end{matrix} = \frac{Corporate\ income}{Average\ number\ of\ employees\ as\ per\ list} \quad (17)$$

$$\begin{matrix} \textit{Ratio of personnel efficiency,} \\ \textit{taking into account} \\ \textit{corporate profit} \end{matrix} = \frac{Corporate\ profit}{Average\ number\ of\ employees\ as\ per\ list} \quad (18)$$

$$\begin{matrix} \textit{Ratio of key personnel} \\ \textit{efficiency,} \\ \textit{taking into account} \\ \textit{net sales revenue} \end{matrix} = \frac{Net\ sales\ revenue}{Average\ number\ of\ employees\ as\ per\ list} \quad (19)$$

$$\begin{matrix} \textit{Ratio of key personnel} \\ \textit{efficiency,} \\ \textit{taking into account} \\ \textit{csales profit} \end{matrix} = \frac{Sales\ profit}{Average\ number\ of\ employees\ as\ per\ list} \quad (20)$$

Note: Ratios are calculated on the basis of various economic effects, i.e. taking into account such effects – for example: corporate income and profit, net sales revenue and sales profit.

The average numbers of employees and of key employees (employees involved in the main activity) of a company are calculated in accordance with the Methodology for Calculation of the Average Number of Employees as per List approved with NSI Chairman Order No РД 07-21 dated 31 March 2007.

In fact, the indicators measuring personnel efficiency constitute a specific expression of the following correlation:

$$Personnel\ efficiency = \frac{Increase\ in\ owners'wealth}{Personnel\ employed\ in\ owners'wealth\ increase} \quad (21)$$

Note: The wealth of owners is the equity.
The increase in owners' wealth is in the form of income and profits.
The correlation becomes specific through these indicators by using particular economic effects (corporate income and profit, net sales revenue and sales profit) as a numerator and the average numbers of employees and of key employees as per list as a denominator.

Man-hours and man-days may also be used as denominators when calculating the indicators measuring personnel efficiency.

The increase in personnel efficiency for a particular period is in the interest of owners as this means that average (key) personnel of one person is employed in the realization of a higher equity increase for such period compared to the preceding one.

The increase in key personnel efficiency is beneficial to a company. For example: where the main activity is industrial, the higher net revenue from sales of finished products attributable to average key personnel of one person over a particular period compared to the preceding one enables higher cash proceeds attributable to average key personnel of one person, which is a prerequisite for higher remunerations of such personnel.

The increase in key personnel efficiency under other equal conditions results in higher efficiency of personnel as a whole. The increase in personnel efficiency provides the option to pay higher remunerations to the personnel members not involved in the main activity. These members have certain official duties and contribute to the increase in personnel efficiency through their work.

Part Three. Cost efficiency and related corporate benefits

Cost efficiency is the economic effect realized through employing average expenses of BGN 1 over the same period. Formula:

$$\text{Cost efficiency} = \frac{Economic\ effect}{Expenses} \tag{22}$$

As mentioned, income and profits represent economic effects in the form of equity (owners' wealth) increases.

On the other hand, corporate expenses represent equity decreases. The correlation may be transformed as follows:

$$\text{Cost efficiency} = \frac{Equity\ increase}{Equity\ decrease} \tag{23}$$

Cost efficiency (taking into account the corporate income and profits as effects) may be defined as equity (owners' wealth) increase, employing an equity decrease of BGN 1. Therefore, cost efficiency is directly related to the interests of owners as an equity decrease of BGN 1 is employed in the realization of a higher equity increase.

Further in this work, we present a number of indicators measuring cost-efficiency, that are specific expressions of the following correlations (already mentioned):

Ratio of efficiency of costs of depreciation of TFA used in the main activity, taking into account net sales revenue	$= \dfrac{Net\ sales\ revenue}{Cost\ of\ depreciation\ of\ TFA\ used\ in\ the\ main\ activity}$	(24)
Ratio of efficiency of costs of depreciation of TFA used in the main activity, taking into account sales profit	$= \dfrac{Sales\ profit}{Cost\ of\ depreciation\ of\ TFA\ used\ in\ the\ main\ activity}$	(25)
Ratio of efficiency of cost of raw materials, taking into account net sales revenue	$= \dfrac{Net\ revenue\ from\ sales\ of\ finished\ products}{Cost\ of\ raw\ materials}$	(26)
Ratio of efficiency of costs of raw materials, taking into account sales profit	$= \dfrac{Profit\ from\ sales\ of\ finished\ products}{Cost\ of\ raw\ materials}$	(27)
Ratio of efficiency of key personnel costs, taking into account net sales revenue	$= \dfrac{Net\ sales\ revenue}{Key\ personnel\ costs}$	(28)
Ratio of efficiency of costs of raw materials, taking into account sales profit	$= \dfrac{Sales\ profit}{Key\ personnel\ costs}$	(29)

Note: The figures used as nominators and denominators refer to the same period.
Key personnel costs equal the total of remuneration costs and social security costs for the same period.
Ratios are calculated on the basis of various economic effects, i. e. taking into account such effects – for example: taking into account sales revenue or sale profit.

The net sales revenue, sales profit and tangible fixed assets (TFA) employed in the main activities have already been clarified.

The formulas calculating these indicators use depreciation costs, costs of raw materials and personnel costs – this classification is type-based and includes some other costs. In other words, these indicators measure cost efficiency based on cost type. However, costs are also classified based on functional designation (cost, administrative expenses, etc.). So, there are indicators measuring cost efficiency based on the cost function. Some of them are:

Ratio of efficiency of the cost
of finished products sold,
 taking into account
 net sales revenue

$$= \frac{Net \ revenue \ from \ sales \ of \ finished \ products}{Cost \ of \ finished \ products \ sold} \quad (30)$$

Ratio of efficiency of the cost of
finished products sold,
taking into account
profit from sales of
finished products

$$= \frac{Profit \ from \ sales \ of \ finished \ products}{Cost \ of \ finished \ products} \quad (31)$$

Ratio of efficiency of the cost
of goods sold,
 taking into account
 net revenue from sales of goods

$$= \frac{Net \ revenue \ from \ sales \ of \ goods}{Cost \ of \ commercial \ activity + Carrying \ amount \ of \ goods \ sold} \quad (32)$$

Ratio of efficiency of the cost
of goods sold,
 taking into account
 profit from sales of goods

$$= \frac{Profit \ from \ sales \ of \ goods}{Cost \ of \ commercial \ activity + Carrying \ amount \ of \ goods \ sold} \quad (33)$$

Ratio of efficiency of the cost
of services sold,
taking into account
net revenue from sales of services

$$= \frac{Net \ revenue \ from \ sales \ of \ services}{Cost \ of \ services \ sold} \quad (34)$$

Ratio of efficiency of the cost
of services sold,
 taking into account
 profit from sales of services

$$= \frac{Profit \ from \ sales \ of \ services}{Cost \ of \ services \ sold} \quad (35)$$

Ratio of efficiency of
administrative expenses ,
 taking into account
 net sales revenue

$$= \frac{Net \ revenue \ from \ sales \ of \ finished \ products}{Administrative \ expenses \ related \ to \ finished \ products \ sold} \quad (36)$$

Ratio of efficiency of
administrative expenses,
 taking into account
 profit from sales of
 finished products

$$= \frac{Profit \ from \ sales \ of \ finished \ products}{Administrative \ expenses \ related \ to \ finished \ products \ sold} \quad (37)$$

Ratio of efficiency of administrative expenses, taking into account net revenue from sales of goods

$$= \frac{Net\ revenue\ from\ sales\ of\ goods}{Administrative\ expenses\ related\ to\ goods\ sold} \quad (38)$$

Ratio of efficiency of administrative expenses, taking into account profit from sales of goods

$$= \frac{Profit\ from\ sales\ of\ goods}{Administrative\ expenses\ related\ to\ goods\ sold} \quad (39)$$

Ratio of efficiency of administrative expenses, taking into account net revenue from sales of services

$$= \frac{Net\ revenue\ from\ sales\ of\ services}{Administrative\ expenses\ related\ to\ services\ sold} \quad (40)$$

Ratio of efficiency of administrative expenses, taking into account profit from sales of services

$$= \frac{Profit\ from\ sales\ of\ services}{Administrative\ expenses\ related\ to\ services\ sold} \quad (41)$$

Ratio of efficiency of sale expenses, taking into account net revenue from sales of finished products

$$= \frac{Net\ revenue\ from\ sales\ of\ finished\ products}{Expenses\ on\ sale\ of\ finished\ products} \quad (42)$$

Ratio of efficiency of sale expenses, taking into account profit from sales of finished products

$$= \frac{Profit\ from\ sales\ of\ finished\ products}{Expenses\ on\ sale\ of\ finished\ products} \quad (43)$$

Ratio of efficiency of sale expenses, taking into account net revenue from sales of services

$$= \frac{Net\ revenue\ from\ sales\ of\ services}{Expenses\ on\ sale\ of\ services} \quad (44)$$

Ratio of efficiency of sale expenses, taking into account profit from sales of services

$$= \frac{Profit\ from\ sales\ of\ services}{Expenses\ on\ sale\ of\ services} \quad (45)$$

A couple of things should be clarified in relation to indicators 30 through 45. The figures used in their formulas refer to the same period.

The cost of finished products sold includes the cost of used materials, processing costs and other related expenses. The cost of commercial activity includes all corporate expenses incurred in the course of such activity plus the carrying amount of goods sold as they relate to the net sales revenue and profit from sales of goods. The cost of services sold includes all direct expenses relating to their creation.

The sale expenses include all expenses directly relating to sales, and the administrative expenses include all corporate expenses incurred in the course of administrative operations of the company.

Where a company carries out one main activity (for example: industrial), the formulas calculating indicators 36 and 37 use the administrative expenses for the period over which the finished products are sold. The same logic applies in case of commercial and service provision activities. A company may perform two or more main activities. If, for example, a company carries out three main activities (industrial, commercial and provision of services), the administrative expenses relating to finished products, goods and services sold over a particular period should be allocated to finished products, goods and services on a given criteria when calculating the indicators measuring the efficiency of administrative expenses.

Part Four. Models for analysis, planning and control of the economic efficiency of real sector companies

The factor analysis studies that have been conducted since the beginning of the last century have a crucial impact on expanding the options to use analytic coefficients for internal company analysis and quality management of companies. To a great extent, this refers to the factor analysis model proposed by experts at DuPont Corporation and developed in the 1920s. That model has become known as the DuPont System of Analysis (also called the DuPont Analysis, DuPont Model, DuPont Equation or the DuPont Method). DuPont Corporation is the first to apply and approve that system. In those days, return on sales and asset turnover (asset efficiency) enjoyed a wide spread. However, they were used separately. The DuPont Analysis linked these indicators with another – the asset efficiency. Initially, the DuPont Analysis included three correlations:

$$\frac{Profit}{Assets} = \frac{Profit}{Sales\ revenue} \quad x \quad \frac{Sales\ revenue}{Assets}$$

Note: X is the multiplication sign.

As shown, the correlation measuring asset efficiency (profit to assets), taking into account profit, comprises two correlations. In other words, it is decomposed into two other

50

correlations that measure the profitability of sales revenue and asset efficiency, taking into account sales revenue.

Theoretically, the experts at DuPont Corporation were not innovators as they used the original concept of linking indicators, which was firstly launched by Alfred Marshall and discussed in his book *Elements of Economics of Industry* published in 1892. Nevertheless, the developers of the DuPont Analysis should be given credit for the first practical application of this concept at their insistence (such linking of indicators had not been practically applied).

We have developed models (models have been developed by the author) in line with the DuPont Analysis that include a number of correlations measuring economic efficiency.

These models may be used by real sector companies to analyze, plan and control economic efficiency using appropriate software. Such software allows quick calculation of the correlation values for the current year and their quick comparison to the same values for preceding years. Further in this work, we present the models that will be useful to real sector companies in our opinion. Their concept is based on the DuPont Model, where a correlation is a result of multiplying two correlations. Furthermore, these models are in line with the Bulgarian legal framework as regulated economic efficiency elements are used.

The presented models have a pyramidal structure with a top correlation broken down into two correlations that equate the top one when multiplied. Each of the two correlations is decomposed in another couple of correlations, etc.

Some of the models may be used to analyze the efficiency of competitors as they allow the use of figures reported in the annual financial statements. So, the data presented in the annual financial statements of competitors may be taken into account as they are published in the Commercial Register which is public: "The Commercial Register and the Register of Non-Profit Legal Entities shall be public. Each person shall be entitled to free access to all data entered in these Registers" (Article 11 of the Law on the Commercial Register and the Register of Non-Profit Legal Entities).

We have developed three models that may be used to analyze the economic efficiency of real sector companies. The first model (Model A) comprises 15 correlations (Figure 6).

A couple of things should be clarified as to Model A, which is in line with the Bulgarian legislation (along with Model B and Model C) as mentioned.

The correlations use the average arithmetical values (average carrying amounts) of relevant resources (capital, equity, borrowed capital, tangible and intangible fixed assets) for a particular period. The figures used as nominators and denominators refer to the same period.

The capital is the total of equity and borrowed capital and, if applicable, financing and deferred income.

The borrowed capital equals the total liabilities, while the income includes the total revenues.

The ordinary activity comprises all economic operations that are regularly performed by a company within its scope of activities and the income from ordinary activity equals the total of operating income (net sales revenue, financing, etc.), financial revenue and other. The operating profit is the positive difference between the operating income and the operating expenses, including costs of materials, depreciation, amortization and other costs and financial expenses. In accordance with National Accounting Standard 1. *Presentation of Financial Statements*, "the operating profit or loss is the profit or loss before profit tax"**.**

Figure 6

Model A for analysis, planning and control of the economic efficiency of real sector companies
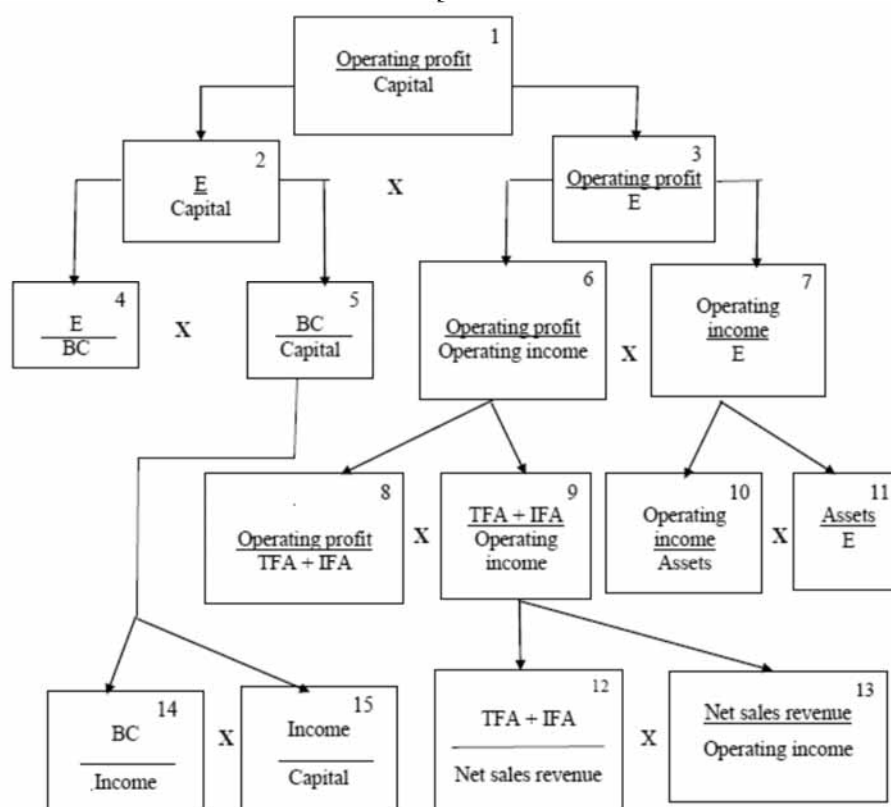
Note: X is the multiplication sign.
Capital = E + BC
E – Equity
BC – Borrowed capital
TFA – Tangible fixed assets
IFA – Intangible fixed assets

The Model A Figure shows that a correlation is decomposed into two correlations, each of which is decomposed into another couple of correlations, etc. and their interdependence.

How to use this model? The figures for the current calendar year may be used to calculate the relevant indicators. In particular, the figures of the efficiency indicators used in that model may be compared to the figures of the same indicators for preceding years and such comparison enables analysts to make certain conclusions. For example, it is possible to identify a downward trend in economic efficiency over the years. In such a case, analysts should give the management body recommendations on elimination of that trend. And the management body may make proper decisions on the basis of these recommendations. Experts should also present recommendations where the actual figures of the economic efficiency indicators (presented in the model) for the current year have a negative impact against the planned figures with the purpose of making adequate decisions. The management body may make decisions on economic efficiency optimization, including optimization of personnel remunerations, optimization of main activity organization, etc.

Company experts may apply that model in relation to competitors as the used data are public – they are reported in the balance sheets and income statements that form a part of the annual financial statements published in the Commercial Register, which is freely accessed in accordance with Article 11, Paragraph 1 of the Law on the Commercial Register and the Register of Non-Profit Legal Entities. The model application in relation to competitors enables comparison of the indicator figures of a company to the same indicator figures of competitors. On the basis of such comparison, a company may undertake measures where the figures of a number of efficiency indicators are unfavourable compared to their competitors' figures.

This model may be also used with data reported for quarterly or six-month periods. In this case, the model may be applied by the company experts only as the data for such shorter periods are not public (though some companies publish interim financial statements in accordance with the applicable accounting standards, including information for shorter periods that may be used by external persons as well).

Using annual data, this model may be also applied by external persons (analysts, lecturers, etc.) interested in the analysis of economic efficiency as public information is taken into account.

The next model (Model B) (Figure 7) also includes a number of correlations measuring economic efficiency and may be applied similarly to Model A. Model B may be used with the aforementioned public data and by external persons such as analysts and other. That model includes the company personnel, the average number of employees as per list in particular. External persons, who wish to use that model, can take this figure from the notes to the annual financial statements that are subject to publication in the Commercial Register as their other parts (balance sheet, income statement, etc.). In accordance with National Accounting Standard 1 *Presentation of Financial Statements*, a company is obligated to disclose the average number of employees as per list for the period in the said notes (point 24.2, letter i).

Figure 7

Model B for analysis, planning and control of the economic efficiency of real sector companies
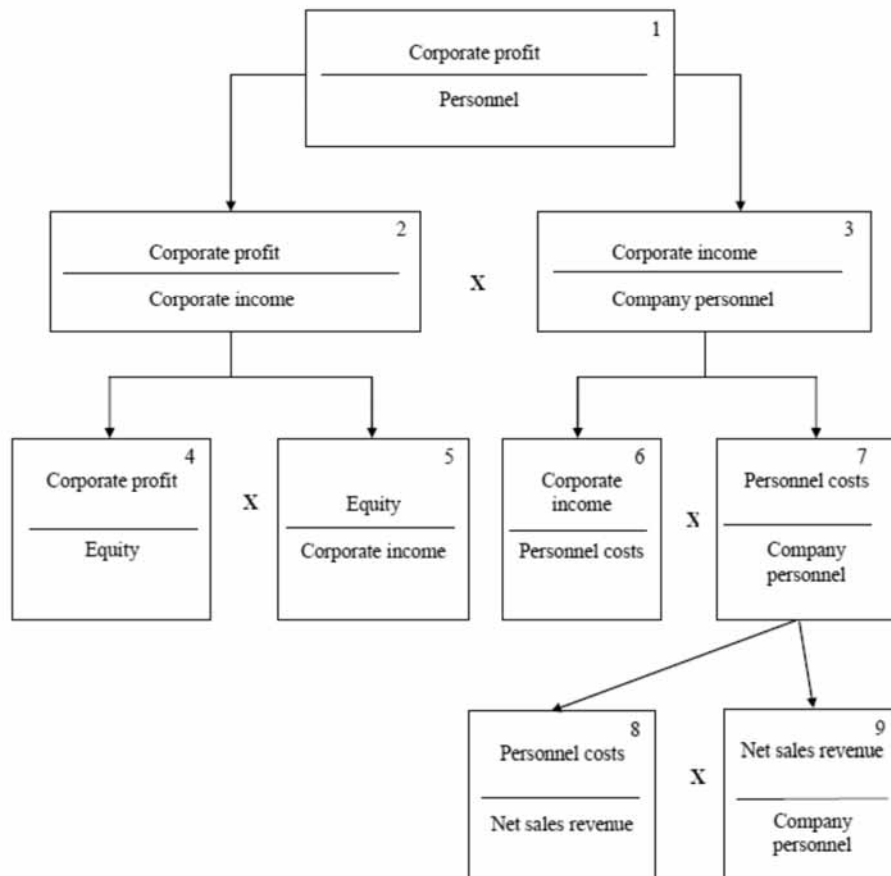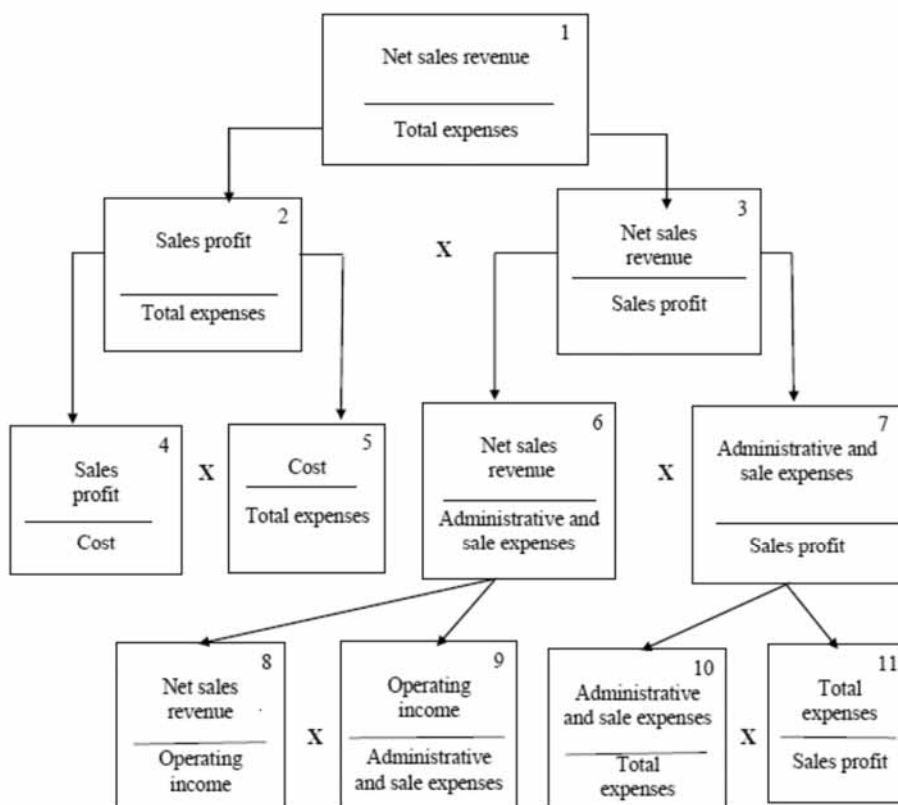

Note: X is the multiplication sign.

The economic effects used in the correlations comprised by Model B are the corporate profit, total income and net sales revenue. The company personnel presented as average number of employees as per list and the equity presented at average carrying amount are the resources. Model B also includes correlations measuring cost efficiency, i. e. correlations 6 and 8 that use personnel costs. The figures used as nominators and denominators refer to the same period. Company experts may use Model B similarly to Model A.

The next model (Model C) includes 11 correlations that calculate certain indicators, particularly indicators measuring economic efficiency (Figure 8).

Figure 8

Model C for analysis, planning and control of the economic efficiency of real sector companies

Note: X is the multiplication sign.

This model may be applied by company experts as most of the used data are not public. They are reported in certain accounts and cannot be accessed by external persons. Most indicators comprised by Model C measure cost efficiency. Used similarly to Model A and Model B, this model enables calculation of current year indicators, comparison of their figures to figures for preceding years, etc. It, however, may not be applied by company experts to competitors in contrast to the other models. The reason is that Model C uses non-

public information, that cannot be obtained, while Models A and B use public information presented in the financial statements, which are published in the Commercial Register.

The advantage of these models is the consideration of economic efficiency elements provided for in the applicable national legislation that are reported in the company accounts and financial statements. The information about these elements may be used to measure, analyze, plan and control the economic efficiency, especially as the annual financial statements of most companies are to be certified by registered auditors. This means that the presented data are correct, i. e. the financial statements give a true and fair value of the property and financial position of an entity and its financial results, cash flows and equity.

A shortcoming of these models is the use of information as at a particular date – for example: 31 December 2019. In 2020, the company may be granted bank credits, issue shares or bonds, etc. but no information about these economic operations is available as at 31 December 2019. This results in changed efficiency elements – resources such as cash, equity and borrowed capital.

Nevertheless, we are of the opinion that the application of the three models may identify the economic efficiency trends to some extent (through studying the figures of model correlations for a specific period – for example: 3 years). Respectively, the company management bodies may take appropriate measures, if necessary.

The proposed models are based on the DuPont Analysis – they include linkage of certain financial correlations but the number of the latter is higher. Moreover, two of the models include cost-efficiency ratios that are not present in the DuPont Analysis.

Further in this paper, we present a brief description of some financial analysis models dealing with economic efficiency but their thorough studying may be the subject of another research work. Besides, there is a lot of relevant information on-line.

The Economic Value Added (EVA) Model was developed by Stewart (1991) based on the concept that a company is profitable if it can cover the cost of its capital, including equity and borrowed capital, in addition to its operating expenses. EVA is the net operating profit less the cost of capital invested in a company:

EVA = NOPAT – (Capital x Cost of Capital %)

NOPAT means Net Operating Profit after Tax, while the brackets include the product of the total capital (equity and borrowed capital) and the cost of capital in %. Such cost is a form of economic efficiency as it is calculated through the ratio of capital costs to capital, which is a type of resource (multiplied by 100).

A positive EVA means that capital (equity and borrowed capital) costs do not absorb NOPAT and a portion of it remains within the company and is used for further corporate development. A negative or zero EVA means that capital costs fully absorb NOPAT.

Another model was developed by the American economist Edward Altman – the Bankruptcy Prediction Model. That model is a three-version formula used to predict the bankruptcy of companies – public and private companies that are manufacturers and private

companies that are non-manufacturers. The three versions include a number of correlations measuring economic efficiency.

There are also models used to rank companies. They include many financial indicators (including ones measuring economic efficiency) of individual weight, i. e. each of them gives a specific number of points. Respectively, companies are ranked into groups of different financial position.

Others that include the economic efficiency are the Return on Invested Capital (ROIC), the Data Envelopment Analysis (DEA), etc.

Compared to the EVA and other models, the proposed three models focus on the linkage of the financial correlations. Thus, the effect of figures of certain indicators on the figures of other indicators is demonstrated. This allows companies to seek options to optimize the values of certain financial correlations resulting in the optimization of other financial correlations. Moreover, the three models focus on economic efficiency, i. e. they include a number of correlations used to measure, analyze, plan and control the economic efficiency.

Conclusion

This work covers a number of correlations and indicators measuring the economic efficiency of real sector companies that may be used to measure, analyze, plan and control such efficiency. In our opinion, the three economic efficiency models provide useful information in light of decision-making as to efficiency optimization. The studied aspects are presented in terms of the Bulgarian legislation. Therefore, this paper has not only a theoretical aspect, but also a practical one.

We consider the study thesis and the study objective and related tasks referred to in the introduction achieved.

The economic efficiency covers a large number of aspects and issues and is the subject of many papers. In this paper, we focused on a thorough study of aspects such as indicators and models for the economic efficiency of capital, assets, personnel and expenses of real sector companies that are of interest to economic theory experts and economic analysts.

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