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Faculty of Business Administration
Department of Business Economics
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The explanation of the difference between the book value and the business value – Valuation problems of the off-balance sheet items of companies

– PhD Dissertation –

by

Péter Juhász, CFA

Supervisor:
Dr. László Reszegi

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INTRODUCTION

In the course of recent decades, the difference between the market valuation of companies and their assessment based on accounting[1] has increased dramatically. In 1978, the book value of companies in the United States amounted to 95 percent of their market value on average, while this rate was a mere 28 percent ten years later. In our days, the indicator is below 20 percent. (Personnel Today, 2002)

What importance does this have? Accounting reports, especially the annual report is provided to each owner. Since more reliable information is not available to them, a large number of minority shareholders use these data in an attempt to understand what has happened at the company in the previous year. These are the data on the basis of which they decide whether to sell their share at the actual rate or on the contrary, buy more stocks. But how could they make a sound decision if they can only see one fifth of the company's worth?

External parties also consider accounting reports as their primary sources. These serve as one of the major inputs for suppliers when examining the solvency of their customer, for banks when evaluating credit risk and for the state when assessing taxes. Can they get a valid picture of the company this way?

The management of the company are at no better position. They can hardly be expected to make correct decisions on the basis of a solely past-based database, especially if 80 percent of the total value is not included. Is there a point in applying decision-supporting systems that do not supplement the information provided by history oriented accounting?

The answer to the above questions can hardly be 'yes'. The inconsistencies revealed in the accounting reports of Enron and WorldCom drew attention to the differences between statements and actual facts. How reliable are the statements which encouraged analysts to suggest buying the stocks of the company even only one or two months before the final collapse? Is there a difference between the business and accounting-based assessment of a company apart from reasons covered by criminal law? Considering these problems is very topical since the set of accountancy rules used in the United States, the GAAP, was significantly modified in 2002 – mainly because of the reasons discussed above.

The goal of my research is to show what caused the difference between business and book values. (My approach to value is from the viewpoint of a perfectly informed owner who is not capable of affecting the strategy.) In order to reveal these factors, however, it is not enough to apply only the tools of accounting or finance: it is also necessary to give a complex overview of the company, of which management organisation, human resource management and information management are vital elements among others.

The complexity of the topic prevents me from offering a detailed and diverse introduction of each question. The primary objective is to identify the particular factors that explain the above phenomena and whose detailed analysis and scientific discussion may be the topic for further research. Accordingly, the explanation of each question will represent their respective importance estimated on the basis of practical experience rather than the diversity of possible approaches or the level of detail applied in specialist literature.

Although the difference between the book and business values of a company may be significant, this should by no means suggest that accounting is useless or faulty. Rather, I am hoping to draw attention to the fact that *the purpose of accounting is not valuation*. The principle of prudence questions the possibility of showing real value anyway, since only the decrease in value must and may be included in the books immediately. The root of the problem is that a tool created for another purpose is often and by many used for a goal it can only attain to a limited extent. But can we blame the metre rule for not being able to accurately measure time?

In the course of my empiric research, I have not only verified the similarity and extent of difference of the business and book values, but have also examined the factors in which the difference is rooted and how the difference changes with time.

The study is structured thus: in the first part, I shall review the possible financial interpretations of value of the firm and the unique characteristics of the accounting approach and measuring of value. I shall devote a separate section to the explanation of the difference between the two types of measurement and the introduction of the factors causing the difference and the possible groups into which they can be classified. This chapter will also present the difference between diverse concepts of value.

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[1] For the purposes of this study, by "accounting" I mean financial accounting based on the principle of receipts, in compliance with strict regulations. (If the case is different, I shall mark the difference as managerial and financial accounting.)

The second part summarises the corrections to company accounts. These modifications are aimed to counteract the differences resulting from the alternative approaches of decision-making and accounting. I will summarise what individually isolable and analysable factors contribute to the value of the firm, and what processes can be applied to make their respective book values more suitable for serving as a basis of financial decisions. The objective of this chapter is to provide an overview of the differences rooted in particular elements of accounting reports and company assets.

The third chapter deals with the possibilities of evaluating and considering the factors affecting value of the firm that cannot be grasped and analysed on their own. These synergic factors, although often of utmost importance with respect to value of the firm, can in most cases hardly or not at all be expressed in money. This chapter will be devoted to the source of added value of the firm as well as the possible methods of classifying the same.

In the fourth chapter, I will offer an overview of the relevant Hungarian specialist literature in this field, and the fifth part will offer a summary of the most important findings. I devoted a part of the sixth chapter to the results of empiric research. By applying the tools of multivariate statistics I will present the extent of difference between market and accounting value measurement and its relation to the structure of the balance sheet. I will deal separately with certain factors not taken into account when drawing up accounting statements, and will also examine the impacts of the structure of the difference on its variability. The study is concluded by a summary and an overview of the possible future use of the findings.

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1. VALUE OF THE FIRM

The goal of company valuation is to specify the realistic and fair price or price range at which a voluntary transfer of ownership is feasible, that is, one of the parties is willing to sell and the other party to buy the company - both following solely their own interests.

Although we accept that a company would have a fair value if an unchanged strategy and perfect supply of information were to be provided, in actual fact we can only define a price range since it is not realistic to specify an exact price. The difference in information available to the seller and the buyer can at the best be reduced but hardly abolished.

The fair price, therefore, is dependent upon the given situation, conditions, time and external factors, and thus the value of a company is not the same for the management, the industrial investor and the inexpert minority shareholder. As a result, we must first clarify what exactly is meant by fair price, and why and how it can be measured.

What is measured?[2]

The relative nature of value is reflected by the high number of different definitions one may encounter in specialist literature. Pratt, offering a summary of these (1992, pp. 12-17) lists six different types of value:

1. **Real market value.** The price at which the property is transferred to its new owner, which means that there is a buyer willing to buy and a seller willing to sell voluntarily.
2. **Internal (investment or base-) value.** A figure computed on the basis of the discounted present value of future cash flows, taking into consideration certain expectations. Due to the involvement of expectations and the difference in available information, it will only become market value if any analyst other than the current owner would come to the same estimated (or different but favourable) figures and expected results.
3. **Fair value.** Usually a price related to a particular share package, also reflecting the extent of influence related to the given level of ownership and other factors modifying value.

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[2] For the problems of measurement in detail see: Jánossy (1963), Bródy (1997) and Csányi (1998).

4. **Going concern value.** This type is more of an approach which emphasises that an operating company is worth more than the total value of its assets.

5. **Liquidation value.** The opposite of the approach presuming continuous operating. This figure represents the value that can be realised on the termination of business activities. In practice, *normal liquidation* and *forced liquidation* are to be differentiated. In the case of the former, the time span available for the sale of assets is longer, while the second is a quick process, which normally results in sale at a significantly reduced price.

6. **Book value.** A concept used in accounting, which does not represent and is not intended to be an actual estimation of value. The sum of the recorded value of corporate assets listed in the accounting statements.

The study will from this point on be focussed on the definition of internal value based on the future income production. I will not deal with the problem of valuating share packages and the ownership rights related thereto (fair value), nor with the other than financial impacts of particular transactions such as psychological factors or the information available to various parties (real market value). **Valuation** is thus performed from the viewpoint of **an imagined ideal owner**.

By the value of the firm I mean fair going concern value, effective capital markets and constant strategy provided, as computed on the basis of future income generation.

Why do we measure?

A company may be evaluated for a number of purposes: privatisation, merger, sale, purchase, stock listing, analysis of issued papers, assessing management performance, specification of insurance value, tax estimations[3] (e.g. in the case of giving gifts, transfer and inheritance) and selection between possible future strategic options (value maximisation). The objective of the measurement usually affects the outcome.

The person performing the measurement also has an impact on the findings. The value of the company is different for various investor groups. Groups of owners examine the maximum value of the firm that can be secured taking their own considerations into account.

When defining value, only a *range* can be specified in practice, within which actual price is based on supply and demand, market factors and the agreement of the parties. Our objective is to keep this range as narrow as possible, since referring to extreme limit values would render the estimation useless and pointless.

How do we measure?

1.1. VALUATION TECHNIQUES

The wide range of requirements described above generates a number of different approaches. These can be divided into two main categories, static and market-based estimation methods.[4]

1.1.1. Static methods

Static methods are based on the data of the accounting information system. Since these data are only valid with respect to a given point in time or a past period, i.e. they represent a story or a state, we cannot draw any conclusions to the *future* when applying the said processes. Because of the different practical application of general accountancy principles, the opportunities contained therein (stock valuation, amortisation) and the items not included in the balance sheet as well as the differences between comparable companies it is very difficult to use these methods.

Accounting-based estimation presumes that value is identical with the historical purchasing cost or production cost recorded in the books, or the corrected figure thereof. Defining the exact extent of modifications necessary requires specialist expertise, and can still prove unreliable due to the incidental nature of the estimation. The value to be corrected is also debatable since the basis of calculation can be the net book value, equity or the total of assets (or liabilities).

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[3] For valuation for tax purposes see: Sutherland (1985).
[4] To introduce various methods I referred to Pratt (1992), Czirják (1997), Brealey – Myers (1999), Palepu et al. (2000), Fernández (2002), Damodaran (2002), Copeland et al. (2000), other sources are marked separately.

The so-called asset accumulation method is a significant improvement to the original concept (Schweihs, 2002). In this case, the assets of the company are revaluated from a market-based approach, then the equity is estimated in the standard way, taking into account the difference between assets and liabilities. It is a substantial difference, however, that in this process, the restrictions of the standard balance sheet are not taken into account, and *all* company assets and liabilities (i.e. not only those normally included in the balance sheet) are assessed, using the methodology most suitable for the characteristics of each group. (Some of these methodologies occasionally consider the future and so do not fit into the definition of static assessment.)

The analysis of assets and liabilities helps experts generate indicators from various data of the accounting statements (annual report) in order to give an accurate picture of the business operations of the company, and to provide a basis for comparison against the same indicators at other organisations.

This method presumes that companies and the accountancy regulations on the basis of which books are kept (after realistic corrections) do not differ to an extent that would render comparison useless.

The following problems exist in connection with the approach analysing accountancy data:

1. Book value and accounting value are not identical with the fair market value of the assets of the company. One must also raise the question of the credibility and correctness of accounting data, which are verified for the needs of the market by specialist auditor companies. Also, it is to be clarified which of the permitted accounting procedures will give the "correct" book value for the given group of assets.
2. Accounting does not include information concerning the future of the company.
3. This method does not take into account the impact of items that are excluded from the balance sheet but do nonetheless have an effect on value.

Due to the above reasons, the static methodology is not in itself suitable for the assessment of the market or business value of a company, since it does not reflect the dynamism of continuous operation. It can, however, prove an excellent tool to evaluate solvency, classify the company, it is a suitable basis for financial and taxation comparisons

and reports or if the company will not continue its business activities (final settlement, liquidation), or if only very few pieces of reliable information are available.

1.1.2. Methods based on market information

The principle of market-based methods is that valuation can only be performed by the market. It is only the entirety of the market that has all the information which can help define the real value, and no single party has all these data.

The basic assumption is therefore that the total value of the company is the difference between the total of net assets and net debt, evaluated on a market basis. Thus **the market value of a company is the net total of the market value of the equity and the net total market value of its debts.**

It is also important to define the concept of **shareholder value**, which means the part of the market value of the company in excess of the market value of its net debts.

In the course of the ***comparative analysis of companies***, the assessed company is compared to a company listed with similar activities and operations at the stock exchange (or one that has recently been transferred to a new owner). This method is a particularly useful tool in founding the valuation and the collection of comparative industrial data (growth, profit rate, capital requirements).

The principle of the ***market-based multiples*** is that the ratio of the market values and other characteristics of two companies considered as similar on the basis of certain criteria is used for the definition of the fair price on the basis of the corresponding datum of the company assessed. The computed indicators are based on prevailing market conditions, therefore (1) the sale and purchase trends resulting from external factors independent of the company may distort them, and (2) – since they originate from the market – they always evaluate the *future* capacity of the company to generate profit. The most well-known of these is the ratio of the market price of a company share and the net earnings attributable to a single share, the so-called P/E rate. Some other such indicators, all based on the total market value of the assets of the company are market value / revenues; market value / earnings before interest, tax and amortisation (EBITDA) or market value / earnings before interest and tax (EBIT).

The primary advantages of such rates are that they can be computed easily and automatically, and that data are easily accessible, this is why they are applied in several

analyses – modified in accordance with specific risk factors. It is not to be forgotten, however, that these indicators are based on numerous implicit assumptions that can often be shown in theory as well. (In detail see: Damodaran, 2002, pp. 468-510., 543-574)

The flexibility, future-orientation, economic and mathematical soundness and the positive test results of the *discounted cash-flow (DCF) method* make it by far the most popular method. The bases of this method were laid down by Modigliani and Miller (1958)[5]. The theoretical systems were completed in the 70s; the principle is that the objective of the company is to maximise the property of the owners and the value of the company. Accordingly, the value of the company is solely determined by the firm's capacity to generate income, that is the present value of the free cash flow provided by the company in the future.

In this method, the specification of the expected cash flow and the discounting rate reflecting the given risk are is a complex task. According to this theory, the value of the company (V) is:

$$V = \frac{CF_1}{(1+r_1)^1} + \frac{CF_2}{(1+r_2)^2} + ... + \frac{CF_n}{(1+r_n)^n}$$

where CF is the free cash flow predicted for the given period and r stands for the appropriately defined discounting rate.

For the calculation of the **weighed average of capital costs,** we need the following:

Cost of debt = The marginal cost of the company drawing on credit, after tax

Equity cost = Risk-free rate + company β * (capital market premium)

Weighed average cost of capital = $\dfrac{D}{D+E} * K_d * (1-t) + \dfrac{E}{D+E} * (r_f + \beta * (r_m - r_f))$

where r_m stands for market interest rate and r_f means risk-free interest rate, β is the beta-value of the shares of the company, t is the tax rate, K_d the company-specific costs of the credit, D the market value of the debt, and E the market value of the equity. (Brealey–Myers, 1999, Copeland et al., 2000, Czirják, 1997) The other process used for the estimation of

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[5] Modigliani, F. – Miller, M. (1958): The cost of capital, corporation finance, and the theory of investment, American Economic Review (48), pp. 260-297. (quoted by Herz et al., 2001)

capital cost is the so-called *build-up* method, where a certain expected rate of return is corrected on the basis of the circumstances of the given company. (Damodaran, 2002)

The performance in the period following the detailed forecast can be approximated by using recurring estimation. Thus, the infinite money flow of the company can be divided into two sections in the following manner:

$$V = \sum_{i=1}^{n} \frac{C_i}{(1+r_i)^i} + \frac{C_n * (1+g)}{r_i - g} * \frac{1}{(1+r_i)^i}$$

where g is the growth rate forecast (Reszegi, 1998). The first part can be considered as the time span of the available business plan covered in the strategy, while the second part is the remainder value which can be – despite its name – quite substantial in cases, since the level of free cash flow sometimes stabilises after a very short period (a few years).

Theoretically, with the maximum of value of the firm provided, shareholder value is at its highest, too (see the Miller-Modigliani formula), but it is known that in practice, due to taxation as well as transaction and liquidation costs, the funding structure has an impact on value of the firm.

Financial models (scenarios, decision trees, real options) provide a simplified framework for forecasting company performance in a certain predictable situation. Sensitivity to various forecast conditions suggests the stability of the defined value of the firm. The most important areas of forecasting are the profit and loss account, the cash flow statement and the balance sheet. Thus, forecasts regarding profitability, credit standing, capital structure and the return of investments can be made.

1.1.3. Measurement problems

The range of methodologies of estimating value looks quite abundant at first glance, which may make it difficult to choose the appropriate one for the specification of value of the firm. Although various methods may lead to rather different results in a particular case, it can be assumed that in the course of scientific development, the tool which is second to another one *in all respects* would have been extinguished, i.e. the common utilisation of the above methods in itself serves as testimony to their application if given prerequisites are met.

All value is relative and acceptable in the given situation only if the applied method gives a reasonable and usable result[6], that is if it can support the performance of business transactions at an approximate value, and its utilisation can be justified. Often, we have to settle for compromises: accuracy and the sensitivity trade-off, the contrast of large time consumption and the quickly changing environment, the significance of the problem and the cost requirements related to the analysis often make it necessary to apply simpler and usually cheaper and quicker, albeit less accurate methods.

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[6] The uncertainty (distribution and sensitivity) of the estimated amount resulting from the valuation is manageable and acceptable.

1.2. CAUSES WHY BOOK VALUE AND BUSINESS VALUE DIFFER

In this chapter, I will examine why book value and the business value defined in Section 1.1. differ. Problems can be organised in three groups. Some of the differences result from the difference between the two approaches (Section 1.2.1.), others from the characteristics of the given accounting system (Section 1.2.2.). The third group of factors originate outside the company: macro-economic and industrial impacts do affect the value but are not included in the scope of accounting (Section 1.2.3.).

1.2.1. Restrictions of book value

Those who suggest using book value as a "fundamental base" usually argue that the methods based on the estimation of generating income in the future that they credit value to something whose occurrence is not certain. On the other hand, what has already happened gives a certain, thus by far more realistic picture of the company, since "the past cannot be taken away". Using book value as the starting point could actually look reasonable, since all figures are backed up by some sort of bills and actual transactions. This argument has three fundamental weaknesses, however.

First, the uncertainty of future earnings is not a major problem. The uncertainty related to future cash flows can theoretically – assuming a suitable number of mutually independent projects – be handled using discounting, scenario analysis, decision trees or options, thus the possibility of measuring realistic value still exists.

Secondly, albeit the past of the company is firm and as such offers a convenient starting point, but – especially with the acceleration of economic changes – it can serve as a basis for the valuation of the future to a shrinking extent. Not only is it impossible for customers to change the past of the company, they cannot buy it, either; what they get are merely the uncertain prospects, hopes and future.

Thirdly, the data in the books do not at all represent the real value of the given assets. The first problem is that statements are made on the basis of transactions that were completed as long as decades ago, and the market changes occurring since then, along with technical and physical obsolescence are not reflected appropriately. They are actually based on *estimations*

of the values presented as made years before (regarding for instance the expected useful lifespan). The other problem, which is perhaps even graver from a practical viewpoint due to being more difficult to detect, is that accounting statements do not include all assets of the company that have actual market value and can be sold separately. Rappaport (1998, p. 31) mentions that intangible assets (information, training, research) – mainly accounted as expenses – have grown to constitute an increasing part of company investments in recent years, and therefore the applicability of indicators related to the book value of fixed capital is decreasing.

The discovery that accounting data are insufficient is by no means a new one: Paton and Sterling (quoted by Barker, 2001, p. 113) drew attention to this problem in 1922 and 1970, respectively, and Barker (2001, p. 113), Schult (1983, pp. 21-27) and Lee (1986, pp. 32-33) also shared this view.

According to Lee, three problems related to accounting data can be identified. The question of *relevance* concerns that financial accounting is primarily intended to provide information to external parties, and it should not come as a surprise that it is not suitable for business-related decision-making with an eye on the future. The problem of *flexibility* originates from the independent nature of accounting policies: the same item can be accounted in a different manner at various companies, and its classification may change even within the same company with time, which makes it difficult to compare data. The third problem is that of the *measurement unit*. Recording assets at their cost price assumes that money will have a constant value, while in actual fact there is not one country without inflation. He believes that an accounting system based on cash flow would be more useful.

Lee et al. (2001) showed when examining the impact of inflation on accounting that the increase of prices has a significant distorting effect on statements. Fruhan (1979, pp. 39-41), Black et al. (2001, pp. 76-77) and Fernández (2002, pp. 185-202) also emphasise that statements are to be corrected to be suitable for the assessment of company valuation due (among others) to the distorting effect of inflation. In addition, different taxation policies, R&D, goodwill and stock valuation methods also contribute greatly to the distortion surfacing when comparing various indicators based on fixed assets and fixed capital. (These are dealt with in detail in Sections 2. and 3.)

1.2.1.1. Accounting as a tool of measuring value

Despite the problems described in Section 1.2.1., accounting statements have great significance for investors. The importance of book value was tested in the United Kingdom by Aboody, Barth and Kasznik in 1999 (quoted by Barker, 2001, p. 122). Their results show that the upward correction of asset value has a positive effect on future performance, which suggests that the decision of the management to increase book value suggests to investors that the company is undervalued. As evidenced in the survey carried out by Barth and Clinch in 1998, the increase in a particular asset group also has importance. The boosting of the book value of assets used in operations (machinery, equipment, facilities) has a more positive effect on the ratio of market price and book value than the growth of other asset values.

Bernard and Noel showed in their publication in 1991 that the changes in the book value, i.e. the recorded value of inventory help forecast the future performance of the company. (quoted by Barker, 2001, p. 123)

Intangible assets have particular importance for investors. Sougiannis found in 1994 that a rise of one dollar in R&D expenditure led to five dollars' worth rise in shareholder value, although expenses were not capitalised. Lev and Sougiannis proved in 1996 that the difference between market and book price ratios could be explained considering R&D as an asset. As the findings of the survey completed by Aboody and Lev, and Barth et al. in 1998 show, the capitalisation of software and including brand names in the valuation also help explain the extent of the difference between the ratio of market and book prices (quoted by Barker, 2001, p. 123).

The above suggest that measuring value on the basis of accounting is relevant to business valuation but not the ideal method: a more accurate picture of value of the firm can be given if other pieces of information are also included. The most important of such additions are related to the consideration of intangible assets.

1.2.1.2. The difficulty of value measurement on the basis of accounting

According to the definition accepted by the International Accounting Standards Committee (quoted by Barker, 2001, p. 107) an asset is a resource at the disposal of the company as a result of past events, from which the business organisation is expected to generate economic profit. Therefore, when including an item in the balance sheet, we have to

answer at least three questions: (1) does the given asset have a value, and if yes (2) how much and (3) can the assets and its value included in the statements as per the regulations of relevant accounting rules[7].

Several difficulties arise on the course of measurement. For instance, in the case of intangible assets like research and development, the measurement of value is rather difficult (the income-generating capacity of current researches will, for example, only be revealed in the future), and thus many accounting systems consider their value as nil, and related "investments" are accounted as current expenses. The other often mentioned problem is that valuation in accounting is not consistent: while certain items are recorded at their current market price, others are in the books at their historical cost, which reflects in some cases a several decades old situation.

According to Barker (2001, p. 108), there are three major reasons for items not to be included in the balance sheet at their realistic value or at all:

(1) Not all goods have a market, for example semi-finished products, second-hand manufacturing equipment, pending developments, advertising, training and other unique assets such as the company name that are not normally sold on an everyday basis. Thus, there is no objective external basis for the valuation.

(2) More than one price (value) may be applicable to the same product. A retailer, for instance, could use the wholesale (procurement) price or the price payable by customers (sale) in recording its inventories. If the asset generates cash flow, its discounted present value may give a third price.

Due to the above, Barker defines three (A-C) values in the course of evaluating the assets of a company, while other authors (e.g. Copeland et al., 1999, pp. 317-318) also use a fourth one (D):

A. Preset value. The present value of income expected from the given asset, discounted at the appropriate rate.

B. Replacement cost. The amount that would have to be paid to procure or manufacture an asset identical with the current one or one that is capable of performing all the currently used functionalities of the asset as well as those that will become necessary in the future.

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[7] The third question is complex, since there are assets whose value is only included in the books as part of an item, e.g. as goodwill.

(With respect to the replacement cost, the expenses for a new asset or one at the same extent of ageing as the current one are to be specified)

C. Net realisable value. This represents the amount for which the asset could be sold in its current state.

D. Liquidation value. If the company were to be liquidated, it is expected that assets could be sold only for a reduced price. This figure represents the hoped price.

In the case of normal operations, the above figures are in the following relationship:

$$A, B \geq C > D$$

To understand the above, it is enough to consider that a well-operating company sells its assets it values less than the market, and replacement is normally performed at the market value of the used asset, but if the asset cannot be purchased used, it often has to be replaced with a new one. (For example in the malfunctioning components of an obsolete manufacturing line.) Because of this second case, nothing can be said about the ratio of the A and B values. When estimating each value, related transaction expenses are also to be taken into consideration.

(3) The third reason why the business value may be different from the figure specified in the balance sheet is that the total of assets is normally worth more than the combined value of the individual items. This is synergy. (Chikán, 1997, p. 464) Barker emphasises that this is why a perfectly performed itemised asset valuation will necessarily lead to an amount below the fair market value. (The reasons for the difference are shown in Table 1) The synergic effect achieved at a company level can normally not be broken down to assets in practice.

If companies only complete projects with a positive net present value as suggested by the theory – excluding the effects of amortisation and tax – the value (expense) of the assets purchased (machinery, people, knowledge) is to stay below present value, which means that synergy is created. Therefore, the asset-based value of a well-operating company is always below its fair market value, but the difference will decrease the larger package of assets is handled as a unit, since their respective values will become easier to estimate using the DCF model. When evaluating an entire company, the processes of the two methods lead to the same results.

The change already mentioned in the introduction is primarily due to these three factors: while the book value of companies made up 95 percent of their market value on average in the united States in 1978, ten years later this figure only reached 28 percent, and in our days it is already below 20. (Personnel Today, 2002)

The essence of asset-based valuation is, however, that it can be used in situations when (1) future cash flows cannot be estimated, or (2) are negative, since in this case the net realisable value (or, if all comes to the worst, the liquidation value) is the lower limit.

The origin of the difference between the book value and the fair value of companies

Reason	Explanation
The assets were not purchased recently	More significant difference between historic and current value
The majority of assets are fixed	The difference between subjective and actual depreciation has a larger impact
The majority of "assets" are intangible	It is less likely that the assets are included in the statements
Items of significant value excluded from the balance sheet	The balance sheet underestimates fixed capital and assets
Long operation cycles	Subjectivity is more important in the valuation of annual performance, especially through asset value and forming provisions

Based on Barker (2001, p. 121)
Table 1

Considering the above problems, the question inevitably arises: if it is so obvious that measurement based on accounting is inaccurate, why is it used nonetheless? King (2001) lists six reasons:

1. The companies are not interested in the correct separation of investments and expenses, since the investments accounted as expenses result in tax reduction.

2. It is by far easier to record expenses and verify statements related to a certain asset than to estimate future income and asses the reliability of the forecast.

3. Risky assets such as research and development projects may prove worthless later on. If they are included in the statements at some value, the management have to enter into explanations in the case of immediate amortisation. If following the other procedure, however, they only have to step forward if a development proves successful.

4. The change in the recorded asset value (according to GAAP) is considered as an income. If assets are underrated, mainly positive corrections are to be expected. If realistic

values are used, the negative effects reflected in company results occur more often, which most managers take pains to avoid.

5. Accountants are cautious by nature, they do not like uncertainty and the modification of rules. They like to stick to the old ways.

6. Although a rather large number of people contest the (GAAP) accountancy system, the participants of business life are familiar with it, they are aware of the shortcomings and make their decisions accordingly.

1.2.2. Comparability of values shown in different accounting systems

The problems of valuation surfacing within the company do not make it difficult to compare only because of the different persons performing the valuation, but also because there are different accounting standards in place in each country. In addition to the IAS (International Accounting Standard) commonly applied in Europe and GAAP (Generally Accepted Accounting Principles) used in the United States, the problem of comparing statements prepared in compliance with national regulations often arises.

Copeland et al. (2000) present a number of fundamental differences between local regulations of accounting that can distort results significantly. The most significant are the differences between the rules of provisioning, company pension funds, the accounting and depreciation of goodwill, consolidation and the revaluation of fixed assets. Similar problems are listed by Brealey and Myers (1999, Vol. I, pp. 469-472)[8].

Barth and Greg (1998) point out that the extent of the distorting effect of amortisation at a rate other than actual depreciation may be rather different in various accounting systems. The Australian regulations, for instance, make it possible to revaluate upwards certain asset groups, with the changes accounted not against the equity but a valuation reserve. (Only entire asset groups can be revaluated, individual assets cannot.) Cotter (1999) cites several surveys that had shown that the primary goal and result of revaluations in the 1970s were to reduce the expenses related to credit taking. The author also shows in his study that such revaluation of assets has been less frequent in the recent years than twenty years ago, and it is becoming increasingly rare that a valuation is followed by drawing on a substantial credit.

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[8] The revision of the characteristics of the Hungarian regulation is given at particular balance sheet items.

Burlaud, Messina and Walton (1996) illustrate by analysing the amortisation regulations of the United Kingdom and France that two entirely identical companies would account different earnings in the two countries.

Chen (1999) compares Chinese accounting regulations with the IAS. He finds that the Chinese systems shows earnings about 20-30 percent higher than international statements. (15 percent of profitable companies appear in the IAS as generating a loss.)

Sokolov and Kovalev (1996) compared the Russian approach to accounting with that of the IAS. One of the most significant differences is the over 40 different types of tax. Companies cannot select their own accounting systems, distortions due to inflation are substantial and the structure of liabilities is also fundamentally different from the system commonly applied in the West: only statutory and reserve capitals are defined, along with the special purpose fund, but the concepts of equity and foreign capital are not used. The comparison of Russian statements is made difficult even at a national level because companies have been entitled since 1992 to select at their own discretion whether to record business event as of the date of the money transfer or the execution of the contract, and there is no obligation for consolidation.

The comparison of countries within one country that apply identical accounting systems may also prove a troublesome task, and even the valuation of the previous accounts of the same company may prove difficult. This is pointed out by Joel M. Stern, one of the founders of consultants Stern Stewart & Co. (as quoted before p. 8) in his preface to Ehrbar's book (2000). He claims that his company had found over 120 potential distortions in the GAAP. Ehrbar adds that, including internal accounting processes, they recommend 160 modifications in an effort to make the measurement of business profit and capital more accurate (as quoted before p. 193). It is true their experience suggested that only fifteen modifications secured acceptable accuracy, but exactly which modifications were to be applied depended on the particular case.

Ehrbar underlines that accounting systems underestimate fixed capital (as quoted before p. 66). He believes the most significant distorting factors are the accounting of research and development as expenses and the amortisation of business value resulting from procurement (goodwill).

1.2.2.1. Business valuation and accounting

Even the above cannot serve as the basis to claim that the accounting systems used these days are faulty. We must, however, be aware that the double-entry bookkeeping method used today is based on *Summa de arithmetica, geometrica, proportioni et proportionalita* written by Luca Pacioli, a monk from Venice in 1494 (Stewart, 1994). The major principles of the system that are still accepted today were defined in the industrial age and laid down in the 1930s. That time excess labour was substantial, while capital was a bottle-neck. Accordingly, the system developed focussed mainly on the tracking of tangible property. We cannot expect this system to be suitable for the accounting of the new types of assets appearing or winning ground in the past 20-30 years.

In addition, the goal of accounting statements is not measuring value of the firm, the creation of value or supporting value-based decision-making but the appropriate information of external parties, with special respect to creditors and the state. It is along these lines that all public statements are based on the principle of caution: they reflect some sort of minimal value on the basis of past data (that are theoretically free from uncertainties). (The statements drawn up for internal use show a quite different, usually by far more realistic picture of the company) This is why Madden (1999, p. 7-8) believes it is not accounting statements that cause the problem but that they are used for the measurement of company performance in some form.

Assuming realistic bookkeeping, almost every single item of the book value underestimates the actual value. So it should come as no surprise that only 38 percent of the company managers participating in the survey carried out by PricewaterhouseCoopers in 1998 believed that the accounting statements prepared were very useful for the valuation of their companies, and it also becomes evident why this rate was a mere 13 percent with respect to companies with high-tech operations. (Osterland, 2001) The extent of distortion differs by industry: while in the early 90s, the difference between the market and book values of company shares in the United States was 25 percent in the steel industry, the same rate reached 250 percent with respect to pharmaceuticals. (Ling-Nagy, 1992)

There is a fair extent of caution underlying the consistent underestimation. Ehrbar (2000, p. 191) points out that when accountants are taken to court on the basis of security-related charges, it is always because of *over*estimating profit or assets, and never because of underestimating them. Burlaud, Messina and Walton (1996) illustrate this by the acceptance of remainder value when defining amortisation. Although certain systems allow for such a value to be accounted, there is not one bookkeeper in the world who would accept a

remainder value *in excess* of the original price (although there is a realistic chance this can occur), since it questions the basic principle of amortisation. It may also prove problematic to establish what share the mere right to implement something has in the value of the project, and how this value changes with time. (Tozer, 2001)

Brealey and Myers (1999, Vol. I, p. 476) also stress this problem, and they claim that excessive caution is not only bad for the management of the company: the return on investment (ROI) indicator shown as higher due to latent assets and underestimated equity make it more difficult for creditors and other external parties to evaluate the profitability of the company (as quoted before, Vol. II, p. 65).

Nakamura (1999) points out that as a result of the immediate depreciation of intangible assets, the earnings shown will be lower, and thus multipliers based on the profit and loss account, such as the P/E rate appear higher than the realistic figure. (Table 2) This is particularly important because it is often assumed that the high indicator is a sign of the growth potential of the company. He believes that it is not only investors who have grown more optimistic in the recent years, but the distortion of the indicator has risen significantly, too.

The profits and stock exchange value of the non-financial companies included in Dow Jones Industrial Average in proportion of the GDP produced by them

Period	After tax profit	Exchange value	P/E ratio
1953-1959	8.8	110	12.56
1960-1969	8.3	145	17.48
1970-1979	7.7	92	11.90
1980-1989	5.2	75	14.55
1990-1997	6.3	127	20.21

Source: Nakamura (1999)
Table 2

Copeland and Weston (1992, pp. 362-370) stress that it is a prerequisite to the effective market that the prices of securities include all relevant information. But the past successes shown by accounting can hardly serve as a basis for making assumptions concerning the future.

Black et al. (2001, pp. 322-323) believe that three different accounting and reporting systems are required in practice. In addition to *financial accounting* that takes into consideration the interests of external parties (especially creditors and the state through taxation) and *management accounting* which is intended to support making business

decisions, *investment accounting* should also be applied, which would take the interests of investors (owners) as first priority and show how the current flow of free cash will change on a longer term and what growth potential new products, technologies, patents or strategic planning have.

The company from a financial viewpoint

Assets			Liabilities
Existing investments generating income	Existing investments	Foreign capital	Borrowed funds
Expected cash flow related to future investments	Future investments	Equity	Shareholders' capital

Based on Damodaran (2001, p. 143)
Table 3

Madden (1999, p. 75) and Damodaran (2001, pp. 142-143) voice similar opinions when dividing value of the firm into two. In addition to the existing investments of the company, its potential future investments and money transfers, that is, growth opportunities may represent substantial value. Because of this, in addition to traditional accounting statements, finance-based reports are also required to reflect all assets of the company at their real (market) value. (See Table 3)

Having assessed the increasing gap between book value and market value (the accounting gap), the FASB introduced new settlement rules with effect from 15 December 2001 (Murphy – Hyde, 2002). The essence of the modifications is that the intangible assets procured by purchasing a company (goodwill) shall no longer be treated as an integral unit but broken down into independent groups. Distinction is to be made between (1) the assets originating in a particular contract or legal regulation and (2) other assets and liabilities that can be separated or sold in any another manner. (Valuing intangibles, 2002)

According to the new guidelines, such assets presented separately have a definite lifespan as a principle, and must therefore be amortised appropriately. Regulations specify five categories. The assets related to marketing (brand names and logos), technology (patents, process handbooks), pieces of art (pieces of literature, copyrights), contracts (licence, franchise) and customers (customer list, waiting list). The remaining useful lifespan (amortisation term) is to be revised annually. (Murphy – Hyde, 2002)

The remaining part of goodwill does not have to amortised, since it will only include assets with unpredictable lifespan (considered as indefinite). However, if the value of these

assets were to drop for some reason, it has to be corrected by means of non-recurring depreciation, and thus the entire goodwill is to be revaluated on an annual basis, and loss is to be written down. (Murphy – Hyde, 2002; Petrash, 2002)

As per the new rules, it is no longer possible to account company purchases using the pooling-of-interests process in which each balance sheet item was simply added up, thus the difference between market value and book value (goodwill) did not appear in the statements. As a result, every merger and company purchase will generate goodwill in the future, which is to be divided in the statements as seen above. (Schweihs, 2002) In order to harmonise North-American accounting methods, Canadian rules were changed similarly with effect from 2003. (Cole – White, 2003)

As a result of the changes, the amount of accounted amortisation is on the rise, and the depreciation of intangible assets has become part of normal business processes, and will cease to be shown as a non-recurring item. On top of all this, the FASB is currently working on new regulations that will require that intangible assets that are currently not presented in the balance sheet be included in the Appendixs to the accounting statements.

1.2.3. Company-specific problems of valuation

Not only the rules of accountancy, but also other factors, especially the legal background and the state of the capital market may fundamentally influence the quality of accounting statements. While the distortions resulting from the differences between accounting rules can be corrected – albeit only through lengthy and exhaustive work, abolishing the impact of historical roots is a far greater task.

1.2.3.1. The effects of historical differences

When considering historical differences, it is enough to remember to factors such as the situation that developed in the 1990s following the change of political system in the countries of Central and Eastern Europe. Not only were economic statements rewritten by the particularly high and hectic inflation, but the structure of the entire society was changing, too. As a result, historic data became irrelevant, no comparative data were available, capital market institutions had just been established, and practically nothing certain could be said

about the future. The method suggested by theory was not suitable for the estimation of the risk-free interest rate, capital expenses or company beta value. (See among others the preface written by László Reszegi to Copeland et al., 1999, pp. 18-32, and Benninga – Sarig, 1997, pp. 194-195)

Problems did not disappear completely after the completion of the changes. In budding or simply not suitably liquid capital markets it is practically impossible to rely on market valuation. Nor can the shares of the few companies listed at the stock exchange be assessed solely on the basis of quoted prices, since very often it is only the transactions of a few large owners that moves prices. It is a characteristic fact that a survey performed in the late 90s showed that the companies listed at the stock exchange showed a poorer average performance that the 200 companies with the largest revenues, which suggests that publicity failed to enforce more effective operations. (Szendrői, 2000)

The other parts of the world also have their specific problems. Copeland et al. (2000, p. 362) cite the example of Japan, where up to half of the value of the firm is made up by shares in other companies, and these shares are very rarely exchanged, and even if they are the details of the transaction are normally confidential. (Copeland et al., 1999. p. 381).

In China, (Chen, 1999) companies can issue shares type A and B, which are identical with respect to vote, other property portions and dividend rights. The difference is that securities of the B type can only be owned by foreigners, while type A can only be exchanged among local parties. According to Chen, due to the language restraints and limited access to information, there is a constant difference between the prices of the otherwise identical papers: type A is traded at a significantly higher value than type B, which is discounted due to the unavailability of macro and micro level information in foreign languages. Since the group of owners is strictly limited, arbitrage possibilities cannot be utilised or abolished. In this case, two different market prices are available for the valuation of the company, which points out that quotes at the stock exchange are only estimations of the actual value of the firm, that is, it is by no means certain that the capital market is effective everywhere.

On the other hand, investors in Norway tend to focus on future cash flows (Black et al., 2001, p. 293), thus capital market prices traditionally reflect the real value of a company. Some authors claim this is due to the high number of oil and gas, transportation and open sea construction companies, which all have substantial fixed assets, as a result of which various revenue multipliers could not be used effectively.

1.2.3.2. Macro economy, life cycles

The difference between the macroeconomic trends of various countries can also have a significant effect on the value of a company. In certain segments, (construction and motor industries) sales are closely related to general social welfare and any expected changes thereto. Often, macroeconomic indicators (GDP, inflation, unemployment) are used as a basis to forecast industrial prospects. (See among others Benninga – Sarig, 1997, pp. 140-157)

The economic prospects of two, basically identical companies can be similarly diverse if the given technology, product or industry is in a different stage of its lifespan in the given area, region or country. Particular products have their own unique lifespans as well (Kotler, 1991), and some claim even companies do (Adizes, 1992).

The valuation of a young segment is made significantly more difficult by the lack of historical data. In addition, due to the normally considerable investments, the statements for the given year cannot be used as a basis for a forecast, and there are no well-priced companies to ease comparison. (Damodaran, 2001, p. 10)

As a summary of the most important points made in Section 1.2., it can be established that the book value computed by accounting is different from the fair value of the company. While failure to include several items and diverse approaches lead to significant differences, investors continue to consider the data given in annual reports as very important. They view the difference as inevitable and are aware of the shortcomings of the measurement, so they can take results into account with the necessary reservations and thoroughness.

The excessive extent of difference is, however, a problem even accounting has to face. The modification of the GAAP in 2002 is a good example of tailoring the rules of accountancy to fit new economic conditions.

The problems specified above do not occur only within a single system, but they also limit the hinder the comparison of statements made in compliance with the national regulations of various countries by the fact that the extent of distortion can be quite different. The gap between the two values is not exclusively due to the applied accounting rules: regional or national characteristics, macroeconomic trends and even industrial cycles may have an impact, too. The aggregate of these factors constitutes the amount excluded from the balance sheet.

1.3. ITEMS EXCLUDED FROM THE BALANCE SHEET

The value of the firm estimated using the methods presented in Section 1.1. – as shown in Section 1.2. – practically always differs from the book value. As already seen with respect to the definition of accounting value, this concept of value does not mean either a measurement or an estimation only a figure for recording purposes, whose amount is not determined along business considerations.

In accordance with the above, **by items excluded from the balance sheet I mean the factors that cause the difference of the book value and the value of the firm, which equal in total the difference between the sum of equity accounted and the book value of the debt portfolio and the business value of the company.**

This difference is by no means insignificant, which is illustrated by the surveys conducted by Boulton and Libert (2000), which show that between 1978 and 1998 in the United States, the average difference rose from only 5 percent of the market value to 72 percent of the same figure. Some authors assume rather extreme views concerning the explanation of the difference. Standfield (2002, p. 48), for instance, believes that the entire difference reflects the value of the intangible assets of the company, which is an obvious fallacy, since the value of an (unoperational) company that has only tangible assets that are all included in the balance sheet is not equal to its book value.

Pratt (1992) claims the question itself is pointless, since book value is not the result of valuation. Contrary to this view, in the first part of their book dealing with modern corporate finance, Shapiro and Balbirer (2000) introduce the balance sheet complete with the intangible assets excluded from accounting, which is thus financially corrected. (A somewhat modified version is shown in Chart 1.)

The methods of evaluating the items excluded from the balance sheet and thus the total assets of the company by item are to be reviewed for the following four reasons:

1. The aggregate asset value thus defined can be used to verify or support value estimated using another method, its significance is outstanding particularly in bankruptcy proceedings and liquidation.

2. Company valuation methods require the separated valuation of assets not used directly in production. The method presented may support this process.

3. These processes can be used in the course of purchasing unique assets, sales, insurance, leasing or franchise agreements and the definition of the fair price.

4. The regular inventorying and valuation of assets enables better management and the more realistic assessment of manager performances.

Balance sheet complete with intangible assets, corrected from a financial viewpoint

Balance sheet	**Assets**	**Liabilities**
	Current assets	*Short-term liabilities*
	Cash, bank accounts	Payable
	Marketable securities	Short-term credits
	Receivables	Guarantee obligations
	Other receivables	*Long-term liabilities*
	Inventories	Long-term credits
	Fixed assets	Liabilities from pension funds
	Land	Deferred taxes
	Buildings	Leasing
	Machinery and equipment	*Equity*
	Invested financial assets	Income from sale of shares
	Goodwill	Capital reserve
Off-balance sheet items	*Intangible assets*	Earnings not accounted
	Protected logos and patents	*Intangible liabilities*
	Sales network	Pending litigations
	Loyal and trained workforce	Permanent employment policy
	Customer loyalty	Devotion to product and service quality
	Certificates	
	Brand names	Marketing and advertising needs

Based on Shapiro and Balbirer (2000, p. 2)

Chart 1

In the next part, I shall describe the roots of the aforementioned differences, that is what items are excluded from the balance sheets at particular companies. I will provide an overview of the possible ways to categorise items excluded from the balance sheet and what corrections are to be performed in the course of preparing a business valuation in order to ensure that the standard income-generating capacity can be defined.

Categories of items excluded from the balance sheet

On the basis of the above, the items excluded from the balance sheet can be divided into three groups:

(1) The book value and replacement cost of assets included in the balance sheet differ. If we were to create a "replica" of the company to be assessed with the same activities, the procurement of the assets included in the balance sheet would cost more than their recorded value. Even in the United States, a country with low inflation, this difference could be 2-2.5 fold. (See among others Booth, 1998)

(2) There are assets that are not included in accounting statements due to the unreliability of their valuation or in compliance with relevant regulations. The company, however, owns and uses these, and may sell the same if necessary to increase income. If the company to be assessed were to be copied, these assets would also have to be purchased.

(3) The value of the company is normally not identical with the total of the amounts computed in the above clauses. This difference, the so-called **added value of the firm** is credited to the "quasi assets" of the company such as its management, employees, the organisational structure and know-how. These factors have an impact on value but cannot be considered as assets in the traditional sense, since they cannot be owned or sold: they actually represent a combination of given production factors. They show what synergic value the company generates by using exactly those assets it owns. Certain components of this value can, of course, also be negative, if the resources utilised could be made more use of elsewhere, and thus they are worth less to the company than if they were sold. The ratio of the above components in the case of a few large companies is shown in Table 4.

Book value, replacement cost and market value of the assets of some large companies

(Billion $)	Market value	Book value	Replacement value	„Hidden value"
Coca-Cola	148	6	15	90%
Microsoft	119	7	18	85%
Intel	113	17	43	62%
General Electric	169	31	77	54%
Exxon	125	43	107	14%

Based on Roos (1997)[9], quoted by Booth (1998)

Table 4

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[9] Roos, J. (1997): Intellectual capital, Macmillan Business

In another approach, the difference between the actual value of assets and the value of the firm is the total of the net present value of existing projects and future growth and development opportunities. Day (1990, p. 336) considers this latter as the value of the strategy used for forecasting. The categories of items excluded from the balance sheet are shown in Chart 2.

Categories of items excluded from the balance sheet
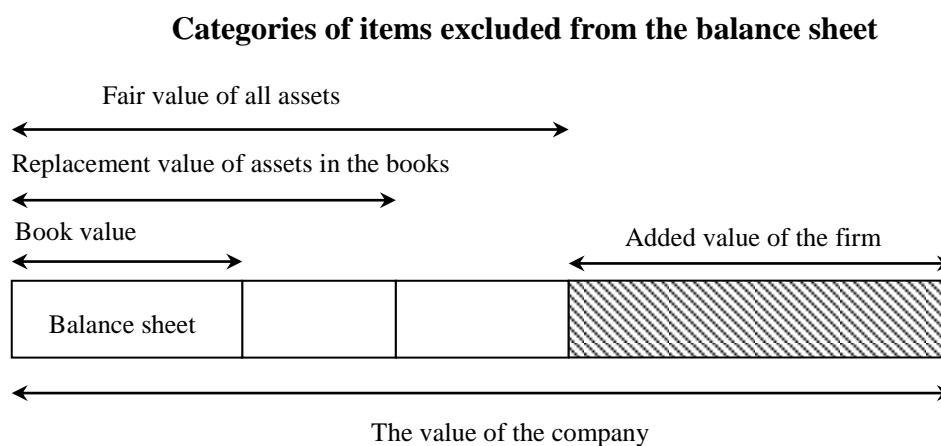
Chart 2

The approach based on income-generating capacity (Table 3) and the one relying on the balance sheet (Chart 1) can be made compatible by grouping items appropriately. The difference may seem significant at first, but it actually originates from two factors.

(1) While the first approach, presented by Damodaran focuses on the separation of past and future with respect to assets, those using corrections as a starting point organise different possible ways of inclusion and accounting.

(2) The second fundamental difference is that the income-based balance sheet uses market values also on the liabilities side, while the objective of the correction approach is in most cases to determine how much capital the owners have invested in the company, in order that a profit of some sort can be shown by comparing this amount to the market value of the shares.

The parallelism of the two approaches is demonstrated in Chart 3.[10] (I have omitted the capital and assets not required for the primary activity. The uncertainty resulting from differing market valuations and balance sheet corrections are market by rectangles with uncontinuous sides.)

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[10] The relations illustrated in Chart 2 and Table 2 are discussed by Gareth Owen (in: Arnold and Davies, 2000, p. 332) with respect to company purchases.

Comparison of the income-based and correction-based balance sheet approaches
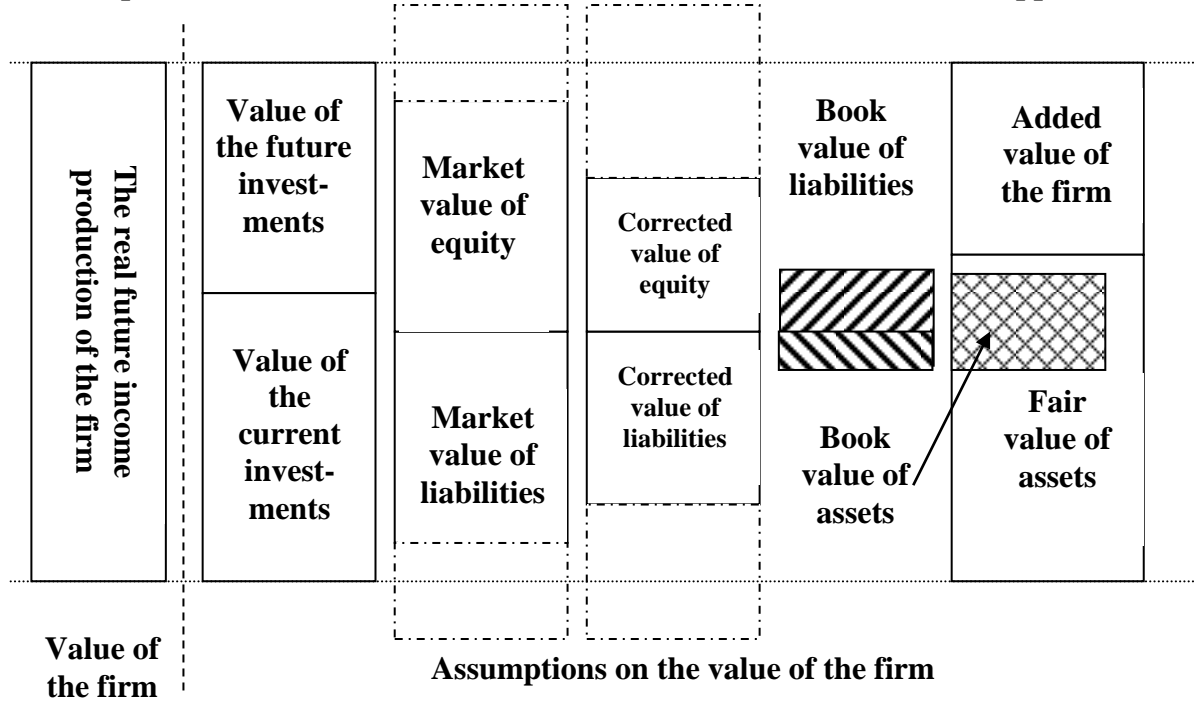
Based on Damodaran (2001, p. 143), Shapiro – Balbirer (2000, p. 2) and Stewart (1991, p. 182)
Chart 3

In order to determine the added value of the firm and the origin thereof, each asset needs to be evaluated. In the next part, I will describe the definition of the replacement, recreation and repurchase value used for the correction, and will also cover the use of methods aimed at the estimation of income-generating capacity, which are not only useful with respect to assets that can be evaluated independently but also in the case of valuing assets used for the performance of the primary activity, whose effect needs to be ignored in accounting statements in all of the presented valuation techniques, then their market value is to be added to the value of the firm at the end of the process.

2. CORRECTIONS TO ACCOUNTING STATEMENTS

To determine the business value of a company, we have to forecast its future cash flow. Damodaran (2001, p. 141) points out that the preparation of an accurate forecast requires several modifications to accounting statements. On the other hand, however accurate the corrections are, when evaluating companies on the basis of public information, referring to inaccurate data is inevitable (as quoted before, p. 107). For instance, the amount of share options provided to managers is normally communicated only in annual reports, and not in the quarterly statements. Therefore an interim assessment can only rely on estimations.

In the next part, I shall provide an overview of the differences between the business and accounting-based valuations of assets, along with specific problems of corrections and the possible solutions. First, I will discuss the general valuation methods of assets, then more detail will be given on certain specific groups due to their significance or unique characteristics.

2.1. GENERAL METHODS OF ASSET VALUATION

The essence of corporate operation is the combination of diverse resources to achieve a value greater than the total expenditure related to the utilised factors. To consider a resource as an asset in accounting, three prerequisites are to be met (Palepu – Healy – Bernard, 2000, p. 4-2):

1. The resource should be owned by the company.
2. The future profit expected from the resource is greater than the past expenses related thereto.
3. Future profits can be measured with acceptable accuracy.

According to the requirements of FASB, the body that compiled the GAAP, the system used in the United States, the accounting system evaluating such assets has to meet the following criteria (Wilson, 1986):

A. The asset is to be recorded at its fair value on procurement or transfer.

B. A decrease in the value of the asset is to be recorded in all cases if presumable or estimable.

C. The increase in the value of the asset must not be recorded until realised by the company, since the amount of the actual growth is uncertain.

The above criteria are in line with the principles of reality and caution set forth in the Hungarian Accountancy Act (Art. 15 of Act C of 2000). Unlike the above requirements, making business and investment decisions makes it necessary to consider a much wider category of assets, normally at a value that represents the fair value of the given asset at any time. This value is theoretically also needed by accounting for each revaluation, since this is to serve as the basis for comparison on which decisions concerning extraordinary depreciation can be made. (In special cases, a value increase can be recorded with respect to certain assets.)

The three requirements concerning assets are not met by a number of resources classified at least as "quasi assets" for business purposes. Requirement (1) rules out the inclusion of leased assets and human resources, requirement (2) is hardly met by intangible assets and research and development, while requirement (3) causes problems when dealing with derivatives. However, the above factors play a significant role in the definition of value at the majority of companies.

This is why the ability to be separated and evaluated individually is the factor that distinguishes between assets and quasi assets in a business sense, while the boundary between asset and expense is defined by the term of the profits generated from the expenses. Accordingly, the valuation methods used in business practice accept higher uncertainty and give an estimation of the value of the resources considered as assets that differs from the amount specified by accounting systems.

The methods developed for the valuation of assets were classified by Wilson (1986) according to whether they are based on the value of the asset measured when procured or on the value achievable when the organisation disposes of the asset. (Table 5)

Classification of asset valuation methods according to Wilson

Type of value	Focus of valuation data		
	Past	Present	Future
On entrance	Historical cost	Replacement value, repurchasing value, reproduction value	–
On disposal	–	Net realisable value, liquidation value	DCF, capitalisation, real options

Based on Wilson (1986)
Table 5

In another type of classification (Damodaran, 2002), the methods developed for the valuation of company assets are put into three groups according to the type of asset whose valuation they are primarily useful for. As for the assets promising separately measurable money flow, the present value system can provide the best estimation, other ones can be assessed most successfully by referring to the relative valuation method, while in the case of assets with an option nature, real option valuation should be used.

The computation of historical cost (purchase and production cost) applied in Hungarian accounting statements is regulated in Art. 47-51 of Act C of 2000.

2.1.1. Cash-generating assets

The primary method for the valuation of assets generating cash flow is the following. First, the free cash flow generated by the asset in the future is specified, which may be before debt or after debt, dependent upon the given funding structure.

Afterwards, the value of the asset at the end of the forecast period is to be determined. This can be positive if further utilisation or sale is possible (for instance in the case of real estate), can be nil, if the asset cannot be used further in any form (expiring lease agreement), or can even be negative if sorting out the long-term status of the asset will lead to further costs (waste piles and the handling of hazardous waste).

The third step is the definition of the discounting rate suitable for the risk of the cash flow, which represents the average weighed cost of equity or the total capital used for funding, depending upon the characteristics of the expected money flow. Finally, the above is to be taken as the basis for computing the present value of future cash flows, and their total gives the value of the asset in question.

This method may seem simple in theory, but in practice it process difficult to use even if money flow can be assigned to the given asset. Brealey and Myers (1999, Vol. II, p. 62) cite the example of the computer used by the logistics department: although we know that better itinerary planning will result in more economical fuel consumption, and a more precise warehouse inventory system promotes faster servicing and smaller loss, the cost savings realised cannot be distributed accurately among new vehicles, dispatcher centres, computers and more well-trained workforce. Thus, the most we can achieve in the majority of the cases is the accurate recording of costs (negative cash flow), which is far from being sufficient for the application of the DCF model.

As a result, capitalising the firmly expected standard money flow is often used as an approximating method. In this model, the cash flow expected to continue on a long-term basis is treated as a rent in perpetuity or an annuity, depending upon the expected lifespan. It is common to apply a combination of the estimation of remainder value, capitalisation and the DCF method in an effort to get the most accurate results.

2.1.2. Assets not generating cash

DCF models cannot be used for the valuation of assets that do not generate cash (or that cannot be linked to actual cash flow), but they may contribute significantly to the value of the firm, and thus referring to the book value will not suffice in numerous cases.

The solution is comparative (relative) valuation. In theory, this process is quite simple: the average market price of similar assets is taken as a basis of valuation in a manner that the unique characteristics of the assets in question are accounted for by including suitable discounts and premiums. This is how the replacement cost, net realisable value and liquidation value seen in Section 1.2. can be defined.

When assuming this approach, a number of practical problems arise. The definition of the range of assets suitable for comparison is often near to impossible. The more unique an asset is, the less likely this method will yield success. Regarding the problem of selection and the process of comparison in detail, see Camp (1998).

The markets of the majority of such assets are not only illiquid but also not public, thus the details of previous transactions are not normally collected and recorded at all or are handled confidentially from the start. Managing the differences that are not of a financial nature (i.e. the specification of premiums and discounts) is also a problem, since their

valuation is subjective. Also, in a number of cases, the value of such assets is actually their rarity or uniqueness (that is, the lack of similar things): the value of a book rarity will be a fragment of its former amount once another copy is discovered.

When evaluating pieces of art and collections, the illiquidity of the market (a work of this artist was sold several years ago), the relative judgement on the differences between the works (from which period of the given painter the picture is) is also a problem. The third factor is the risk posed by possible forgery: substantial specialist knowledge and expensive examinations are required before a purchase. (Damodaran, 2002, pp. 767-769) Albeit the appearance of Internet-based exchange and auction services, gathering information on the prices of low-value common items has become less difficult, we are still light-years from the solution of this problem.

2.1.3. Assets of optional nature

There are assets whose value does not originate in their capacity to generate income or their usage but from the underlying possibility that they may come to be included in one of the groups discussed before if certain prerequisites are met. The right to publish the books of a yet unknown author is a typical example, since it might become very valuable – even if it is unlikely. (It is important to stress that such hidden options can be found among the existing assets of the company: a let out plot located next to the factory may provide an opportunity to expand capacities more easily, cheaply and quickly.)

Since in the case of these assets it is not only the value that is questionable but also whether it can be realised, their worth can only be established using the tools developed for the valuation of financial options – which also only become valuable if certain conditions are attained. (For the methods of evaluating financial options and the theoretical background behind option valuation, see Bodie-Kane-Marcus (1996), Hull (1999), and Száz (1999)) By applying the optional pricing formula used for financial products to physical assets the concept of real options brings flexibility and the capability to actively react to the environment into the valuation process.

Damodaran (2002, p. 88) claims that optional valuation is required if handling assets (1) whose value depends upon the value of other assets, and (2) the money flow related to which depends upon the occurrence of a particular event.

According to Barker (2001., p. 215), the concept of real options is applicable if (1) the related money flow is uncertain, (2) the company has a right but no obligation to obtain a certain cash flow, and (3) the investment is to be irreversible (sunk), which means that it cannot be revoked or sold later. He points out that while in the DCF process the value of the project is decreased as a result of the higher discount rate if uncertainty (risk) rises, he principle of option pricing is that value rises in such cases.

Abel et al. (1995) offer another viewpoint of the differences between the optional approach to investments from the pure NPV method. They believe that each investment can have an expansion and a termination option. While the former resembles a purchase option, the latter is similar to a sale derivative, originating from the reversibility of the investment. The former option reduces, while the second increases investment willingness. They also point out that the lack of revocability in itself does not reduce investment willingness in the case of uncertain prospects, since an option securing gradual expansion may decrease risk. As the values of both options grow in line with the increasing of uncertainty, the investment optimum will be different for each level of risk.

There are basically two methods for the valuation of options. Either a replica of the portfolio is created (this concept leads to the Black-Scholes model) or a decision tree is used, when the value is computed by multiplying the amounts at the various possible endings and their respective chances of occurring. If it is taken into account in this latter model that the capital cost used for discounting is different at certain junctions due to external factors, the two pricing processes should theoretically give the same value. (Damodaran, 2002, p. 814)

Factors affecting the value of financial and real options

Financial option	Real option
Share price	Expected cash flow
Exercise price	Investment cost
Risk-free interest rate	Interest rate suitable for risk
Volatility of share price	Volatility of expected cash flow
Remaining time until expiry	Remaining time until expiry
Dividend	Cost of holding the option
The value is *independent* of the expected rise in the value of the underlying product	The value is *dependent* upon the expected rise in the value of the underlying product
Immediate exercise	Exercising requires time

Based on Fernández (2002, p. 529)

Table 6

Fernández (2002, p. 546) stresses that the Balck-Sholes formula will only give reliable results in the case of options that are replicable, since the application of a risk-free interest rate cannot be justified otherwise.

2.1.3.1. Types of real options

Specialist literature specifies several types of real options in order to ease recognition. If the start of a project (investment, expansion, commissioning) can be postponed, it is called a ***delay option***. ***Expansion options*** entitle but do not oblige the company to expand or enter new markets in the future, that is, to grow, if deemed favourable. Copeland et al. (2000, p. 398) call these opportunities management flexibility options. In their examination of flexibility options, Black et al. (1999) differentiate between internal and external flexibility. The term external flexibility is used in the above sense, while their definition of internal flexibility is the ability of the company to assess a project quickly and decide whether it is worth continuing and if it were appropriate to accelerate (or slow down) the next phase (Black et al., 1999, p. 196), that is, the capacity of the company structure to generate added value of some sort.

Options linked to funding flexibility. Damodaran (2002, p. 808) claims that the cash in excess of the required amount for operation at the disposal of the company can be considered as a flexibility option. He lists four factors excluded from the pricing model that may affect the value represented for a certain company. Thus, (1) companies with large-scale and stable cash flow, the option related to funding flexibility is lower, while (2) in the industry segments that have not yet stabilised and therefore promise significant extra profit, this option is more valuable. If (3) a company can easily access of external funding options (issuing shares or bonds, bank loans), the value of the funding flexibility made possible by the high amount of disposable cash is low. Damodaran believes this is the reason while private (not listed) companies and small businesses evaluate this form of flexibility more. (4) In industries where investment (and thus funding) requirements can be forecast with greater certainty, the value of such options is lower.

When commencing an investment, it is of utmost importance to define the extent of loss resulting from the failure of the project. (According to the industrial approach of Porter (1993): each exit barrier is also an entrance barrier.) If it turns out that an ongoing project will never become profitable, the ***exit option*** related to the investment can be quite valuable.

Copeland et al. (2002) define two more types of options. **Complex options** are actually options for options. Gradually expandable investments and R&D projects are also classified in this group. According to their explanation, a new product or production capacity represents only an option for securing results in the future, and therefore these should be evaluated according to the principles applicable to such complex financial products. (For a detailed description of the method, see e.g. Hull, 1999)

The so-called **rainbow options** contain at least two risk factors (the profit realised from R&D projects, for example depends upon the changes in technology and the market). To be able to evaluate these, it is not enough to assess the possible outcome of one factor, but all of them. Complex decision trees may help the process.

Brealey and Myers define exit, timing and flexible production real options. (1999, Vol. II, pp. 109-133). While the definition of the exit option is the same as seen above, the timing options is the equivalent of the delay option defined by Damodaran.

The option for **flexible production** is a new item. Its value comes from the fact that available production capacities may be reassigned, that is, it reflects the flexibility of the product portfolio manufactured as well as its ability to be tailored to suit market needs. valuation is possible by means of decision trees.

Barker (2001, p. 215) mentions three types of options. In addition to the delay option, which is identical with those seen above, he defined a learning and a growth option. The growth option is the same as the expansion option as per the classification set up by Damodaran. The **learning** option is the possibility to clarify an uncertainty. This may mean the clinical testing of a medicine, whose success is actually only a possibility (option) that the product will be successful on the market.

2.1.3.2. Limitations of real options

The application of this method is hindered in practice by severe problems. Barker (2001, pp. 216-217) stresses that in addition to the high amount of information required, this approach has practically all faults found in other valuation methods. The problem is not only the estimation of the future cash flow, but the uncertainty that one of the sources of value is to be estimated on the basis of past data only, while in the majority of cases we are actually interested in a novelty that has no history (new technology, market, R&D). Therefore, it should come as no surprise that this method failed utterly in the case of Internet-based

companies ("dotcoms"), but it has been used successfully for a long time with respect to natural resources, where we have a significant base of historical data regarding market prices and variance, and the size of reserves can also be estimated relatively well.

I have revised general asset valuation methods in Section 2.1. The value of assets generating cash may be specified on the basis of discounted cash flow, while the assets to which direct cash flow cannot be assigned are to be evaluated using the comparative method.

The group of assets with an optional nature is a special one, since their value is largely based on the outcome of an external process, described with likelihood distribution. In such cases, valuation systems capable of handling uncertainty and distribution (options, scenario analysis) may be the ideal tools.

2.2. CORRECTIONS TO THE ASSET SIDE OF THE BALANCE SHEET

Applying the asset valuation processes introduced in Section 2.1. to the particular property components of a company, it becomes possible to identify several of the roots of the difference between the book value and the business value. Sections 2.2. and 2.3. will describe the assets and liabilities that cause the most significant differences. The second purpose of reviewing balance sheet items is to identify the assets and liabilities required for the primary business operations and to exclude and individually evaluate the items unnecessary from the normal functioning.

2.2.1. Current assets

In the case of current assets, the reasons for the necessity of corrections are rather diverse. As for money instruments and marketable securities, the goal of the screening is to identify the components which are not required for the generation of future income that serve as the basis of the valuation. When considering various receivables, collectibility is to be taken into account, while in the case of inventories it is to be assessed how realistic the recorded value is.

2.2.1.1. Surplus cash

If a company has at its disposal money instruments that are not required for its regular business operations, their value is not include in the discounted worth of future cash flow, therefore this is to be added to the value based on the income-generating capacity.

This group of assets does not mean cash: its close substitutes, such as short-term state bonds, deposits and saving accounts also belong here, since these can be turned into cash quickly and at a low cost.

According to Damodaran, surplus money instruments can be considered as a flexibility option (2002, p. 808) or, if required for future expansion as a current asset or separately, together with financial assets. (2002, pp. 424-425)

2.2.1.2. Marketable securities

Public securities, bonds and shares issued by other companies can be recorded in the balance sheet as financial assets. For the valuation of these items, Damodaran proposes three methods. (1) The current market value of the securities is added to the value of the firm computed using the DCF process. This method is used in valuation with continuous business activities. (2) The various costs and taxes related to the sale of the papers are deducted from their market value, and this amount is added to the value of the firm. This method is used on the liquidation of the company. (3) In the case of packages that represent a large share, the company owned is to be evaluated separately, and then is the value of the given share to be defined (Damodaran, 2001, p. 212).

In the statements prepared according to Hungarian regulations, securities are to be evaluated separately, and the market reputation of the given company is also to be taken into account when evaluating shares (Art. 46, 54 and 62 of Act C of 2000). Accounted depreciation may be rerecorded if its market value is significantly and permanently higher than the book value.

2.2.1.3. Receivables from customers

Uncollectible receivables are to be deducted from customer receivables, but if they can usually be factored, the realistic price (normally around 10-20 percent of the receivable amount) is recorded. In practice, it is often useful to divide customer receivables by market segments or sale destinations (export/domestic). Since sale forecasts are made separately for each market or division, the components of the divided customer receivables can be forecast separately, which will help approximate the future situation.

Certain service providers may have a performance that they have not yet invoiced to their customers but have not included elsewhere in their balance sheets either. The current, partly completed works of legal consultants, auditors and consultants often yield no income, while all costs have already been accounted for the term of invoicing. In such cases Pratt (1992, pp. 287-288) recommends that the part of the consideration attributable to the level of performance should be included in the reports as a customer receivable.

It is to be noted, however, that the appropriately selected accounting policy, if complied with, along with correct auditing guarantee in theory that the actual value will not differ significantly from the book value.

As per the Hungarian accountancy rules (Art. 55 of Act C of 2000), the receivables not settled by the day of preparing the balance sheet are to be revised, and if the loss is permanent and significant, it is to be accounted. (In the case of debtors of small amounts, this can be done as an aggregate amount, by the percentage of the recorded value.) Previously accounted depreciation may be written back when conditions change, up to the original book value. These operations are to be described in the Appendix of the annual report in detail.

2.2.1.4. Other receivables

Fees payable for membership in certain organisations and insurance charges are often due in advance, in a lump sum, even for a whole year. If such prepayment has been made as of the date of preparing the valuation, the already accounted expense is to be compensated by the charges due for the remaining period, included among receivables. Since in the case of items reaching beyond the business year such problems are dealt with by means of provisions, this correction is only significant in the case of valuations prepared for a different term.

Also in the case of receivables from affiliated companies, employees and owners, it is worth assessing how likely the debt is to be collected. If it is company practice to regularly release these debts, or redemption is not probable, they are hardly worth considering for valuation purposes.

2.2.1.5. Stocks and other assets

When evaluating companies or comparing performances, either in time or between different firms, the application of different inventory accounting systems may lead to significant distortions. Thus, the stock value suggested by the FIFO system, which utilises the prices of materials inventoried first may differ greatly from the amount computed according to the LIFO system, which takes the prices of the latest procurements as the basis, especially if inflation is high. (Hungarian rules only permit the FIFO system, thus we do not have to face this problem.)

In 1975, the boosting rate of price increases in the United States encouraged hundreds of companies to change to the LIFO system, thus reducing their tax obligations originating from the increasing value of their stocks. On the other hand, it was a restraining force that the American stock exchange supervisory authority, the SEC, requires that the statements prepared for investors should have the same stock valuation method as in the one made for taxation purposes, and this decreased accounted profits. (Ehrbar, 2000, pp. 90-91) (The difference between the results shown by the LIFO, the FIFO or a market-based valuation method is often accounted in the United States as LIFO Reserve.)

Copeland and Weston (1992, pp. 24-25) cite the same problem, and they point out that this trend casts lights on the difference between maximising profit per share and shareholder value. On the basis of their surveys, Sunder and Ricks (as quoted before, pp. 363-364) state that the investors in the capital markets of the United States focus primarily of cash flow, although they admit that changing over to another inventory valuation system did lead to a rise in quote price.

Mulcahy (1963) contests the principle that stocks should be recorded in the books at the lower one of purchasing cost and price market price. He believes this results in inaccuracies, and leads to the regrouping of earnings in consecutive years. According to him, if there is no absolutely obvious link between the market price of the end-product and the inventory, the losses computed in advance will not actually incur, or at least not at the time and to the extent accounted in the traditional methods. Accordingly, and implicitly in line with the going concern principle, he considers a net realisable value of some sort as the appropriate starting point, computed on the basis of the estimation of the expected sale price of the end-product, from which expected (further) processing and sale costs have been deducted. If this exceeds the cost price, he claims that the stocks should not be depreciated. On the other hand, in the case of raw materials, since such estimation would be difficult to make, he would allow using the replacement cost (as quoted before, p. 20), which is supported by the fact that these materials can be used for the manufacturing of new products, different from the one in question, and can also be sold on the market.

Mulcahy (as quoted before, pp. 27-30) supports his proposal by proving that Canadian companies often deviate from the original principle, anyway. In the extraction of precious metals, it is common practice to include the ore in the book at its cost price, since there is a price guaranteed by the state in most places, which means that the stock can be considered as a quasi receivable. Waste is often accounted at the realisable value (expected sale price) as

well, but for an entirely different purpose: deviation here is made necessary due to the impossibility of estimating the production cost in this case.

Guatri (1994, pp. 34-35) draws attention to the fact that accounting assignments that can only be performed in a long term that have been partially accomplished (equipment, vehicles and buildings manufactured for several years) may also lead to inaccuracies. It is also Guatri who points out that trading companies record their stocks at their latest purchase price or sale price. This may cause a problem if the value of the stock in question changes rapidly, such as fashion goods, where amortisation at the end of the season may be enormous.

Similarly to customer receivables, inventories should be broken down by division, activity and market segment in an effort to secure more accurate business forecasts, especially if the given product fulfils unique needs or the given raw material is special.

On the basis of the above it can be stated that the correct valuation of stocks is a task that is practically impossible without complex and internal pieces of information, and may thus contribute greatly to the inaccuracy of the estimation of value of the firm. The method selected should always be appropriate for the characteristics of the given company.

2.2.6. Valuation of intangible assets

The part of company property that does not have a physical form and tangible appearance is called intangible. Accounting is most cautious when assessing this group of assets. Since the valuation of such assets is highly uncertain, most regulations only permit market-based valuation: if the given asset was not purchased by the company from an external party but rather produced by itself, it cannot be included in the balance sheet in the majority of cases.

Significance of intangible assets

According to a survey report of the OECD, prepared in 1992 (as quoted before, p. 186) the intangible assets of companies based in developed countries grow more rapidly than other types of assets. (Black et al., 2001, p. 186). This is confirmed by the more recent surveys carried out by Nakamura (1999) (Table 7) .

**Investments of non-financial US-based companies
in percentage of the GDP produced by these firms**

Period	Material assets	R&D	Advertising costs
1953-1959	12.6	1.3	4.2
1960-1969	12.7	1.7	3.9
1970-1979	13.9	1.8	3.4
1980-1989	14.1	2.3	3.9
1990-1997	12.6	2.9	4.1

Source: Nakamura (1999)

Table 7

Sougiannis (1994) examined US-based companies between 1975 and 1985, and found that a single dollar increase in R&D costs added an annual two dollars on average to the earnings of the given company for seven years, while value of the firm increased by five dollars. According to a survey prepared at MIT Sloan School of Management, between 1964 and 1998, a one percent rise in R&D costs at the 3,500 sample companies increased the ratio of the market and book value of equity by 4.3 percent, while the same increase in marketing costs widened the gap by 1.8 percent (Pearl, 2001). Bharadwaj and Konsynski (1997) found that between 1989 and 1993, a 1 percent rise in IT costs added 0.37 percent to the ratio of the market and replacement cost of company assets ("Tobin's q"). Bosworth and Rogers (2001) found a significant and firm connection between the market value and R&D activities of Australian companies and their accounted intangible assets.

This means that the effect of intangible assets of value is far from negligible, and the inaccuracy caused by shortcomings of accounting is constantly rising, despite that even the most often criticised accounting systems are modified in an effort to adapt. According to a survey carried out by Brand Finance and covering 188 companies of the United Kingdom, the share of intangible assets within net assets rose from 4 percent in 1993 to 14 percent in 1999. (Haigh, 2001.)

Albeit certain intangible assets are included in the balance sheet, these items are the most often cited examples of components excluded from the balance sheet. According to the regulation of the IAS (Lilly-Reed, 1999) intangible assets can only be included (individually) in the balance sheet (strictly at the cost price), if (1) it can be clearly separated from goodwill, (2) it is at the disposal of the company, (3) the realisation of the future cash flow related to the asset is highly probable, and (4) the expenses related to the asset can be measured accurately. This definition means that in practice, most intangible assets are excluded.

The inappropriate handling of this group of assets by accounting is a shortcoming specialist literature first pointed out for several decades ago. (See for example Hiroyumi Itami, 1987, quoted by Damodaran, 2002, p. 555). Barker (2001, p. 114) believes there are numerous reasons of the fact the most problematic item is the recording of intangible assets. The market of these assets is perhaps the farthest from perfect, since a lot of these items are unique or inseparable from the given company (e.g. the company name serves as an umbrella brand). In addition, the cost and value of assets transferred on the market can be significantly different.

The methods used for the valuation of intangible assets can be divided into three groups (cost-based, market-based and income-based). (See among others: Schweihs, 2002).

1. Cost-based valuation methods. These methods have three underlying principles. (1) The principle of replaceability states that no investor will pay more for an asset than how much it would cost to replace the asset. (2) The principle of supply and demand is that the value of the given asset is simultaneously affected by its availability and the demand for it. (3) The effect of external factors means that as a result of external events, the value of an asset may change, regardless of the two previous points, because of market and social trends, for instance, or along with a change in the legal background or the introduction of a new industrial technology. Depending upon the above, therefore, a (re)production value, a replacement cost and a liquidation value can be calculated for each asset. (As a fourth group, the "valuation" based on the historical data or procurement costs is also traditionally included.)

The reproduction or production value is attempt at estimating what expenses would incur in the course of producing a substitute for the given asset. This type of valuation is particularly useful if the given asset serves operation directly. Such may include maintenance and repair agreements, customer and supplier lists and subscriptions (Pratt, 1992, pp. 393-395).

2. Market valuation methods. In the case of these methods, the appropriate market is to be identified first, along with the comparable products and transactions (sale and purchase, licence). Their relevance is to be verified, since distortions can arise not only with time but also as a result of market changes, as well as the interests and relative power of the parties, too. Since transactions are not standardised in any respect, the most problematic part is often finding the suitable basis of comparison. The asset in question is to provide suitable correction

for the prices of particular deals, and the estimations are to be compared against each other and expert opinions.

The complexity of this method, usually applied with respect to processes, technologies and brand names, is well illustrated by the fact that the following need to be taken into consideration during the correction (among others): (1) the legal conditions of particular agreements, (2) the specialities in financing, (3) the relative power of the parties, (4) the then and now existing market trends, (5) the changes to the industry in question, (6) the geographical and location differences, (7) the term of the agreements, (8) the restrictions of utilisation, (9) the sharing of economic tasks (marketing, R&D, copyright charges) and (10) all other assets involved in the deal, along with the conditions of the transfer.

3. Income-based methods. With respect to these methods, Schweihs (2002) defines five sub-groups. The valuation can be carried out on the basis of (1) what extra income owning the particular asset generates, (2) what cost reduction it enables, (3) what lease or royalty fee would have to be paid otherwise, and what lease or royalty fees could be generated from transferring the product in the market. The estimation can also be performed by (4) defining the value of the entire company (or business unit) with and without the particular asset, and the difference is the asset's worth. In addition, there are methods which (5) are based on the residual amount of the value of the company or business unit or asset group also including intangible assets that cannot be accounted for otherwise.

Along the lines of computation techniques, income-based methods can be divided into two groups. Direct capitalisation methods specify the standardised income for one period, and then define its present value handling it like a rent in perpetuity or an annuity. DCF methods (Schweihs calls them profit capitalisation methods) provide forecasts for more than one period, and they are capable of applying different discounting rates for various points in time.

Pratt (1992, pp. 393-395) draws attention to the limitations of the applicability of these methods. The capitalisation of profit or savings is only feasible if the expected results will prevail for an extended period, nearly eternally. Thus, Pratt claims, these methods can most suitably be used for patents and copyrights. Their value can be specified both from the viewpoint of saving the potential expenses related to similar rights and by estimating the earnings realised. On the other hand, he points out that as the remaining lifespan decreases, these methods will give an increasingly inaccurate result, and therefore the suitable valuation technique may change. The discounting of the expected cash flow related to the asset, however, can only be used if a fair estimate of the linked expenses and incomes can be given.

In the case of certain patents, their value can be approximated by assessing the present value of their possible renting out.

The difficulties related to the **valuation** of intangible assets **during liquidation** were described by Anson (2002, 2002b) and Anson and Lussan (2001). They stress that the most important step is to break up the integrated group of assets handled as goodwill, to identify and separate them individually. The valuation methods presented above are based on the going concern principle, but this is not applicable during liquidation (final settlement). Anson (2002b) believes a liquidity discount of 30-90 percent should be applied with respect to intangible assets in the case of financial difficulty.

In such cases, the market factors named technology factors by Anson (2002) may also play a decisive role. He emphasises that what matters is not only what value the given asset can generate and how modern it is but also how many similar assets are being marketed at the same time, and how many potential customers are present on the market.

He specifically underlines the importance of the time factor: intangible assets' lifespan is often rather short (especially is little care is taken to maintain them in the course of the liquidation). The lifespan of some software is no more than 6-12 months, brand names and right expire after a few years, which means that a lengthy liquidation can ruin most of the intangible property. According to Anson's estimate (2002b), the value of intangible assets decreases by 2-5 percent during every month of the bankruptcy or liquidation procedure.

Accordingly, the value is to be defined on liquidation by considering what cash income can be realised by selling it in the shortest possible time. This means that the starting point should be the lowest replacement cost, from which a number of administrative charges are also to be deducted. At the start of the liquidation procedure – due to the short lifespan – it is recommendable to focus on the sale of intangible assets. In order to do this, the part of the intangible portfolio that can be sold independently are to be separated, listed by item. The full documentation concerning each of them is to be prepared, and all related information, descriptions and electronic data are to be collected in an effort to secure smooth transfer even if the majority of employees have already left the company. Since the sale of intangible assets requires specialist knowledge, Anson and Lussan (2001) claim that an expert should in all cases be assigned to this task. This involves a minimum base charge in most cases, which is supplemented by a part of the sale price realised as a success premium.

Considering the range of valuation options it should be no surprise that Standfield (2002, pp. 83-84) claims that the accounting difference found in statements actually originates from the fact that while in the case of tangible assets, identical events are treated differently according to the given activity (the purchasing of office supplies can be an investment or an expense depending on whether they were procured for own use or resale), this flexibility is not found here. The author suggest the introduction of intangible accounting, with separate intangible asset, liability, expense and income accounts, although he recommends that some of the expenses should be capitalised as a unique valuation basis.

Black et al. (2001) divide intangible assets into four categories[11]: (1) innovation capital, (2) structural capital, (3) market capital and (4) goodwill. Innovation capital is reflected in the costs of research, development and reorganisation, which are often expensed. Structural capital represents the coherence and flexibility of the company structure. The ability of the company to adapt to changes, the skills and loyalty of the employees are included here. Market capital includes brand names, logos and franchise rights that are transferred between companies. (Black et al., 2001, pp. 186-188)

According to Standfield (2002, p. 48), there are two sub-groups of intangible assets: (1) those that can be owned (hard intangibles), such as brand names and copyright, and (2) those that can only be managed (soft intangibles), for instance quality and know-how. Since the balance sheet only includes property that is owned, I will focus on the valuation problems specific to these, while the valuation of soft intangibles ("quasi assets") will be dealt with separately in Section 3.

Hungarian accounting regulations (Art. 25 of Act C of 2000) defines five types of intangible assets:

1. **Capitalised value of establishment or reorganisation.** This represents the capitalised value of the expenses incurring in connection with the commencement, extension or modification of activities. Costs related to the introduction of quality insurance systems are also included here.

2. **Experimental development.** This title includes the activation of the expenses that will be returned in revenues on the future utilisation of the generated result, and do not become apparent in the form of other asset that can be capitalised.

3. **Property type rights.** This means the rights not connected to real estate which are not considered as intellectual products. Thus can lease, utilisation and concession rights be included in the balance sheet, along with various brand names and licences.

4. **Intellectual products.** This group includes inventions, patents, industry samples, software and other intellectual products protected by copyright, know-how, manufacturing processes and the logo. These can be included in the statements regardless to whether they had been produced or only purchased by the company.

5. **Business or company value.** This item represents the extra payment made in the hope of future profit on purchasing a company.

In addition to the above, advance payments made for and value corrections of intangible assets are also recorded separately. The rules of depreciating intangible assets are summarised in Table 8.

Hungarian accounting rules for the depreciation of intangible assets

	Amortisation	Unplanned loss of value	Rerecording	Value correction
Founding and reorganisation	yes, max. 5 years	N/A	N/A	N/A
Experimental development	yes, max. 5 years	possible	possible	N/A
Property type rights	yes	possible	possible	possible
Intellectual products	yes	possible	possible	possible
Business value	yes, min. 5 years	N/A	N/A	N/A

Based on Róth et al. (2001, p. 72)
Table 8

Hungarian regulations require that the value of intangible assets is to be depreciated in excess of the planned amount if book value is permanently and significantly higher than the market value, or its value is reduced permanently (damage, destruction, redundancy).

On the other hand, if market value significantly exceeds the book value or the reasons for the previous depreciation no longer hold, the value can be corrected by rerecording, up to the amount of the previously accounted depreciation in excess of the planned. (Art. 52, 53, 57, 58 and 80 of Act C of 2000)

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[11] The further possible groupings found in specialist literature are discussed in Section 3.

It is also possible if the market value of the property type rights and intellectual products exceeds their rerecorded book value significantly and permanently, the difference can be included as a value correction against the valuation reserve line on the liabilities side (Art. 57 and 58 of Act C of 2000).

2.2.6.1. Research and development

In their discussion of the difficulties of value based managing a company, Black et al. (1999, pp. 192-194) point out in connection with high-tech industries that one of the most severe problems with the application of the principle is that there is no comprehensive concept covering the valuation of innovation, which has outstanding importance in these segments. They note that DCF and valuation with multipliers also lead to inappropriate results, albeit for different reasons. The first one is hindered by the difficulty of forecasting, while in the second one, it is rather problematic to assess high-value unique characteristics. Due to the above, they propose the use of the real option approach, which is deemed inapplicable by many due to the impossibility to find projects with similar levels of risk.

The model set up by Black et al. approximates the value of R&D by the market value of the future growth potential it generates. The market value of the company is divided in two:

$$MV = VEA + VGO$$

where MV is the market value of the company, VEA is the value generated by existing assets and VGO represents the worth of company the growth opportunity.

They suggest estimating market value with reference to share quotes, and the generated value component by using the discounted cash flow method based on the present standard income. Their survey shows that growth potential in the high-tech sectors can reach as much as 70 percent of the value of the firm. (The one-sidedness of this view is illustrated by the fact that, as it will be shown in Section 3, this value is credited by other authors exclusively to the management, the intellectual capital of the company or the strategy. (See Standfield (2002, pp. 124-125), Day (1990, p. 336), Black et al. (1999), Strassman (1990, pp. 88-89), Kay (1993, pp. 206-210), Sargeant (2001).)

It is worth noting that in high-tech sectors it is not only the estimation of standard income that may prove problematic, but also that the company often performs below the coverage level in the first years of growth, and standard cash flow is negative. Baruch also stresses (Gross, 2001) that the majority of developments do not result in new products but rather target the improvement of existing processes (higher effectiveness, faster servicing), and thus it is hard to allocate them to the appropriate R&D project. Also, capital market as a means to measure value has spectacularly proven a failure even in countries with a well-developed capital market such as the United States. Application in Hungary is made even more difficult by the fact that only a few tens of companies are listed at a stock exchange.

Fruhan (1979, pp. 35-39), Stewart (1991, p. 30), Brockington (1996, p. 90) and Ehrbar (2000, p. 197) claim that all R&D expenses should be capitalised, and then – suggests Ehrbar – depreciated in an average of five years. (The accelerating rate of technological obsolescence is illustrated by the fact that 20 years ago Fruhan recommended a depreciation period of ten years.) They believe this would prevent that the developments promising returns in excess of the capital cost be rejected in difficult economic periods in an effort to keep costs low and show better earnings. (This argument is not in line with the cash-flow based approach of modern corporate finances.)

However, the IAS and the accounting regulations of the United Kingdom also permit the capitalisation of research and development expenses. (Barker, 2001, p. 115) Eszter Bölöni Felsmanné points out in her notes made to the Hungarian translation (Ehrbar, 2000, p. 196) that unlike the GAAP, Hungarian accounting rules recognise the concept of experimental development, which can be depreciated in five years at most. In addition, it is only successful developments that can be capitalised, which is even closer to the business approach, since unsuccessful developments reduce the value of the company, and only successful ones add to it. (The item is included among intangible assets in the balance sheet.) The Hungarian regulation does not accept market research, quality assurance, patent and licence activities, either, (National Technological Development Committee, 1999), which often add to value of the firm, and should, from a business viewpoint, be considered rather as investments.

Lilly and Reed (1999) note that the research expenses thus accounted may contribute significantly to inaccuracy, in a manner adverse to developers. This is because if they manage to solve a technological problem in-house, the expense is to be accounted immediately, while the same asset can be capitalised in the case of making an external purchase.

Although Brockington (1996, p. 90) claims that wages related to the R&D activities and unsuccessful developments should also be depreciated, Stewart (1991, pp. 29-31) believes it would be recommendable to capitalise the expenses of unsuccessful developments as a preparation of some sort for later success. If the drilling of a well leading to an extractable oil deposit, for instance, is preceded by a number of unsuccessful drillings, these need to be considered together: the unsuccessful drillings are among the prerequisites for successful extraction. (This argument basically reflects replacement cost-based approach rather than the historical method.)

Horwitz and Zhao (1997) examined the effect of the ratio of the capitalisation and depreciation of research costs on market prices. Their results suggest that regardless of the method applied at the particular company, the investors "capitalised" up to 75 percent of R&D costs when establishing prices in the United States between 1989 and 1993.

Chan et al. (1999) examined the market valuation of research and development at some of the major stock exchanges of the United States. According to their estimates, in 1995, on average 29 percent of the book equity of companies was made up by the value of R&D activities not included in the balance sheet. Their calculations show that the average profit on the shares of companies with significant R&D activities was practically identical with that of businesses that were not involved in large-scale development, which proves that the market has included the expected profit of developments in the share prices despite the fact that incurring expenses were accounted as expenses immediately, without activation.

On the basis of the above, it is expedient to divide the intangible assets related to the R&D field into two groups. The items actually included in the balance sheet are in the final stage of development, with a lower level of risk (clinical tests, trial production, setting up technologies). These can be evaluated appropriately using the DCF method, treating former development costs as sunk expenses.

The products and processes in the significantly more risky early stage can be evaluated using the optional methods, provided that a suitable number of parallel projects and correction options are available to the company. If not, profitability can be approximated by means of scenario analysis.

2.2.6.2. Franchise rights

A franchise right entitles its owner for the sale of a protected service or product in return for the payment of a fee. From an economic viewpoint this is reasonable if the usage of the given brand name will help realise extra earnings and profit. According to Damodaran (2002) the amount thereof can be computed on the basis of the following.

The value of a ***brand name*** represents how well-known the given name is, or how higher a price will be acceptable for the product, and how much sales volumes can be increased as a result thereof. ***Exclusivity*** shows how unique or how easily replaceable the product or service in question is, while the ***legal monopoly*** nature of the franchise limits the entry of competitors offering the same products. These components reduce company-specific risk.

On the other hand, the franchise might have a negative effect on the customer: the problems of the owner of the franchise right can easily be transferred to the members of the network, who may be rather hapless, since their bargaining power is low due to their relatively small size. Also, the value of the franchise right may be decreased by the owner if they extend the network by including new members, since thus the added value provided by exclusivity and the legal monopoly will slowly diminish, and also the attractiveness of the brand name is distributed among the members of the chain. The franchise value will also be reduced if the owner neglects regular "maintenance" and marketing support, thus deserting the defenceless chain members.

2.2.6.3. Brand names, copyrights and licences

Brand names, copyrights and licences provide the company with the exclusive right to produce a certain product or service. Napier (1994, pp. 94-96) suggests that if it is possible (in the United Kingdom) to capitalise the costs of research and development, why cannot the same be done to the expenses related to brand building.

The valuation of brand names and accepting their importance has become so common in the past decade that there are several types of insurance policies available to cover any unexpected loss of value thereto (for instance due to a recalling of products) (James, 2001). In connection with the changing taxation viewpoint on brands and franchise rights, Haigh (2001) stresses that tax authorities will hardly accept in the future if a company does not charge its affiliated businesses for the use of its brand names, or if it only requires a (minimum) fixed

rate, as is the common practice today. This means that substantial income will be entered into statements, whose origin (the invested capital and asset) will not be excluded from the balance sheet. (For the details of evaluating copyrights, brand names and licences, see Juhász, 2003a.)

2.2.6.4. Marketing expenses

Marketing expenses can be divided into two groups. One of these is aimed at maintaining the reputation of existing brand names, in an effort to support the annual sales plan. All authors agree that these should be accounted as costs. Some of them, however, result in the creation or strengthening of brand names, any may lead to a future increase in sale volumes, that is, they could be considered as an investment of some sort. This is why the practice that all such costs are accounted as expenses in the year of incurring cannot be fully supported, since this creates an asset property that has no trace in the balance sheet albeit it has a value, perhaps even its market value can be defined and realised on the sale of the asset or the entire company.

However, keeping strictly to accountancy considerations, this is not the division required. If brand names are treated as assets, all marketing costs related thereto should be capitalised, and the appropriate depreciation accounted at the same time. (The basis could be the lifespan estimated without marketing support. This can reach several decades in the case of well-known brands, and may not even be as long as a month with respect to new ones. The question is made even more complex by the fact that the extension of the brand can lead to a well-known name being used for a completely new product.) "Brand operation" costs, such as the maintenance of copyright, a periodical expense, however, need to be separated.

This latter view is taken by Fruhan (1979, pp. 35-39) and Ehrbar (2000, p. 203) among others. The former suggests the capitalisation of all marketing costs, to be depreciated afterwards in six years. This is, of course, only one of the methods used to evaluate brand names (market reputation), and if another method is used, correction cannot be performed. Ehrbar points out that marketing expenses can generate not only brand names: he also recommends that the marketing costs of mobile phone service providers related to the gaining new subscribers also be capitalised. The term of depreciation should be established depending upon the expected period of keeping the customers.

2.2.6.5. Contact lists and archives

The value of the existing contacts of the company becomes most evident in the comparison of a newly established business and a company that has been operating for several years. Pratt (1992, p. 390) calls this the owner's list, including the list and addresses of consumers, customers, patients and suppliers. These can, however, only be considered as assets in the traditional sense if they are also valuable to others (that is, there is a realistic chance they could be made use of) and if they can be sold. (Not only the lack of demand, but also legal regulations may prevent the sale.) As a principle, older, more stable relationships are always worth more than new ones.

Their value can be estimated on the basis of the costs of finding, gaining and keeping similar customers. (This value should be corrected with the transmigration rate expected at the transfer.) Contact lists that are only valuable to the company can be included in the company added value. (See Section 3.)

Similarly to contact lists, the archives of the company might also be valuable to someone else. Their value can be estimated according to the cost of their replacement or the profit on renting them out. In the case of certain special collections (record, photo and film archives), the valuation has to taken into consideration their historical value and − especially if they cannot be replaced − their ideal value. The worth of the archives and plan archives that have no economic value to others cannot in practice be separated from the company. I will deal with the valuation of these under the umbrella of explaining added value of the firm.

2.2.6.6. Transferable contracts

Certain agreements make it possible for the contracting parties to transfer the rights and obligations set forth therein to other parties. Such may include extraction, frequency utilisation or broadcasting concessions. If these have an independent value, it must be recorded among the assets of the company, most likely at the market price. In certain cases, contracts with particular customers or supplier and subscriptions may also be in this category. If the concessions are of a permit nature, which means that they cannot be transferred, or there is no demand for them, they are more of an entry limit, and should be included among quasi assets (Section 3).

2.2.6.7. Goodwill

Goodwill (business value) is a special group of assets, since it is generated if a company is purchased at a price higher than its book value. Since it has been illustrated how the book value is in all cases the lowest estimate of the value of the firm reflected in the purchase price, goodwill is created in practically all cases.

According to relevant Hungarian rules, the business or company value is to be depreciated in a maximum of five years. (Art. 52 of Act C of 2000) The legal regulation accepts four ways of approximating the goodwill (Art. 3 of Act C of 2000). Thus, the price paid on purchase can be compared to (1) the market value of the assets acquired, (2) the market value of the shares acquired or, if the company is not listed at a stock exchange (3) the equity attributable to the share acquired. In the case of a transformation, (4) the business value based on the income-generating capacity and the total market value of assets are to be recorded.

The four versions may lead to completely different results, since – assuming that the purchase price was based on the income-generating capacity of the company – in case (1) the goodwill is the added value of the firm, in case (2) it equals the part of the extra value not accepted by the market, in case (3) it shows the total of the assets excluded from the balance sheet and the added value of the firm. In case (4), the results are similar to those in case (1), but if the parties deviated from the income-generating capacity in either direction during the price negotiations, solutions (1)-(3) already include that inaccuracy, while case (4) does not.

From an valuation viewpoint, four (or five) sources of the business value can be identified. (See Table 9 and among others Barker, 2001, pp. 143-144). It may derive from (1) the difference of the actual and book values of the assets recorded in the books, from (2) the value of the assets excluded from the books, from (3) the future growth potential (or, according to another interpretation, from quasi assets), and from the synergy of purchased assets that has already become visible and measurable. Synergy can be divided into synergy created (4) by the purchase, or (5) previously existing, generated by the former firm. Future growth potentials, if we take a different approach, can be computed as the difference between the total of the above and the actual purchase price.

The latter two approaches can be used depending on whether the DCF-based method, the asset-based, or the real option method is used for the valuation of the company. (Since the

entire company is evaluated, the DCF model broken down to individual asset includes the value of indivisible synergies, while in the case of taking each asset into account independently, the extra profit generated by synergy and market prospects are also to be taken into consideration.)

Parts of purchased goodwill

1.	+ Difference of the market and book values of assets purchased and included in the balance sheet
2.	+ Market value of assets not included in the balance sheet
3.	+ The internal synergic effect of the company purchased ("generated goodwill")
4.	+ The value of the synergy between the buyer and the purchased companies
5.	+/- The difference of the final price and the total of the above

Based on Barker, 2001, p. 143

Table 9

In most cases, however, the division seen in Table 9 is not available, albeit in accordance with Hungarian regulations (Art. 25 of Act C of 2000) the fifth element could not be included with respect to business value (goodwill), but it should be depreciated immediately in compliance with the business valuation principle (!). Any difference favourable to the customer, i.e. a negative line 5 cannot be recorded as profit, since the principle of caution prevents that the total of the first four elements be value higher than the purchase price.

We must not forget, however, that goodwill comes from the difference of the value of the procured assets that can already be found at the buying company. Therefore, special care is to be taken in order to avoid double recording.

Barker (2001, p. 144) emphasises that an acquisition in itself never generates value. (If either party wins, the other one necessarily loses.) This means that the result of the earnings statements is irrelevant, the transaction was favourable or unfavourable to shareholders to the same extent, regardless of the accounting technique used.

2.2.7. Financial products

There are several financial products that represent a future disbursement or one whose date and amount are uncertain. Since their actual financial effect will only occur in the future, these are normally only included in the appendix to the financial statement. Such include the

various types and combinations of futures products, warrants, convertible bonds, convertible preferred shares, financial (not real) options and the various forms and combinations of swaps. We must not forget that some of these products (bonds, interest-bearing shares, dividend preference shares) may be recorded at both the assets and liabilities sides, depending on whether the company in question has entered the capital market as the inviter, issuer, debtor, buyer, investor or creditor.

Although these items are normally left out of the balance sheet, and may significantly affect the value of the company, and therefore must be included in the valuation process, I will not detail their valuation in the course of this study. Not only do I exclude them due to the sheer complexity of the topic but also because this constitutes the single group of off-balance sheet items, which has already been included in the curriculum of Hungarian higher education, and several works have been published on it in Hungarian. For the detailed and exhaustive discussion of this topic in Hungarian see for example Bodie-Kane-Marcus (1996), Hull (1999) and Száz (1999).

2.2.8. Machinery and equipment

In many cases, the value of the assets and manufacturing equipment used in production is significantly different from the figure shown in the balance sheet. (See for example Blackman, 1986, p. 57.) The market value of such equipment is based primarily upon their level of wear and the effectiveness of the technology they apply, which has often nearly nothing to do with the amortisation accounted.

According to Guatri (1994, pp. 28-29), various types of possible value losses are to be examined so as to establish the actual obsolescence. (1) *Economic obsolescence* is the result of external factors independent of the company. Such may be a change in the situation of certain base materials, the availability of services or market conditions. Related losses can be most easily grasped through the extra costs made necessary by the new situation.

(2) *Operating obsolescence* originates from the physical wear and tear of the machine that is a natural result of its operation. The extent of the loss is illustrated by the extra costs of production and operation, which can be defined against their respective levels on procurement or the values measured with new devices.

(3) *Functional obsolescence* is the effect of technological development. The amount of amortisation can be approximated by means of the development costs required to reach the

previous level or the reduction in the market price of the obsolete product (the realisable income) or the extra expenses that occur.

According to the Hungarian regulations (Art. 52 of Act C of 2000), when defining the extent of planned amortisation, physical and technical depreciation are to be taken into account. On the other hand, extraordinary loss of value is to be accounted if (as quoted before Art. 53) the book value is permanently and significantly above the market price. (This can be added back once circumstances change.)

In the case of this asset group, it is particularly difficult to define the realistic value, since in most cases there is no market for complex devices and production lines, the details of sales are confidential and only repurchasing value can be estimated, replacement cost cannot, due to technological obsolescence. In the latter case, the price of modern devices that have the same functionalities may serve as a starting point, which is then to be reduced in line with different levels of effectiveness (speed, economical operation, accuracy) and physical wear and tear (remaining useful lifespan).

Swieringa (1997) points out that in the case of certain production devices (nuclear power plants, mines and combustion plants), the expected liquidation and recultivation expenses may reach a significant amount. The discounted present value of these costs should be included among liabilities at a company level, but with respect to particular assets, if its valuation can only be carried out comparing it to other machines, the possible difference in liquidation costs must also be taken into account.

The valuation of assets that have been depreciated entirely in the accounting but are still usable may pose another problem, along with the utilisation of the assets that were recorded in the books at their remainder value on the termination of a leasing agreement.

Hungarian accounting rules include arrangements for this problem: if the value of the tangible asset permanently and significantly exceeds its book value, the difference can be recorded as a value correction against the valuation reserve line on the liabilities side (Art. 57 and 58 of Act C of 2000). It is not mandatory, however, to perform this correction to the statements.

2.2.9. Valuation of real estate

Virtually all company balance sheets contain real estates, whose expected useful lifespan may reach several decades. This time is perfectly sufficient not only for real estate market trends to change and for city building policies to be altered, but also for the internal construction and infrastructure of the building to become completely obsolete (lack of air-conditioning or established computer network). In the meantime, the book value is separated from market trends and follows an entirely different path unless significant reconstruction is performed: the predefined amortisation is in hardly any way connected to the actual value loss, let alone any increase in value.

Barker (2001, p. 112) also points out that there is yet another type of inaccuracy: the real estates owned by the company may have been purchased several decades apart in time, thus particular recorded values will entirely reflect the current situation, while others not at all. This leads us to concluding that an actual multiplier the application of which would render itemised valuation unnecessary can hardly be defined, even if the prices of the properties had been affected by nothing but inflation and market trends.

Hungarian accounting rules require only the tracking of value loss (unplanned amortisation), but it also provides an opportunity to account for value increases by means of rerecording and value correction (Art. 57 and 58 of Act C of 2000). Thus, the significant difference between the market value and book value of real estates is hardly due to inappropriate regulations.

In case of an asset-based valuation, the valuation or revaluation of real assets is indispensable in all cases. However, Copeland et al. (2000, p. 362) point out that in the course of a DCF-based valuation, value of the firm is to be increased by the difference of the recorded and market values of only those assets that do not contribute to production, since the value of the other assets is already included in cash flow. (Alternatively, the forecasts can be based on the rent for a substitute suitable for the given purpose or its current market price, provided that the real estate used today could be utilised for other purposes in a more profitable manner.) (For the details of real estate valuation see Juhász, 2003a.)

One of the sources of the items excluded from the balance sheet of a company is the difference between the accounting and business values of the company. Having considered the asset side of the balance sheet hat provide an overview of the properties of the company,

we have seen that various asset groups contribute to the difference between book value and business value for different reasons and to different extents, depending upon the characteristics of the enterprise in question.

These corrections assist a valuation of the company that is closer to the business approach, but it is also necessary to more accurately review liabilities in the balance sheet in order to define the value of equity.

2.3. CORRECTIONS TO THE LIABILITIES SIDE OF THE BALANCE SHEET

Following the specification of value of the components of company assets, the equity can be determined by reducing the amount of the above by the value of the different liabilities as defined from a business viewpoint. In order to do this, the items on the liabilities side of the balance sheet also need to be revised.

There are two prerequisites to including a payment obligation as a liability (Palepu – Healy – Bernard, 2000, p. 5-2): (1) the company has accepted an obligation for something, and (2) the amount and timing of the obligations can be estimated with acceptable tolerance. The difficulties of valuation usually arise from the fact that the existence of the obligation is uncertain, the amount and timing of payments cannot be accurately predicted or the volume of the liability changes.

According to the terms of the Hungarian Accountancy Act (Art. 42 of Act C of 2000), liabilities are only the debts accepted by the entrepreneur that are expressed in terms of money and are related to already performed services.

There are, however, a few corrections that arise from the nature of company operation. Joel M. Stern, one of the founders of the consulting firm Stern Stewart & Co. wrote the preface to the book of his partner (Stewart, 1991, p. xix), and draws attention in it to the fact that the most valuable "*assets*" of monthly and daily newspapers are accounted as *liabilities*, as is the case concerning not yet earned subscription fees. In the next part, I will discuss in detail the corrections that are commonly applied at companies.

2.3.1. Suppliers

If it is our intention to forecast operating profit, the suppliers to various divisions should be treated separately, since the diverse growth rate of different markets may have a significantly dissimilar effect on company funding, if the payment deadlines set by individual supplier groups vary greatly.

The commercial credit linked to supplier contracts is normally considered in the specialist literature as having been made on the basis of actual agreements and in familiarity with the terms of payment, that is, the payable price already includes interest. However, the expiry of supplier invoices can be quite long in some cases. A payment deadline in excess of one year can be considered as hidden credit in many cases, which is worth evaluating independently on the basis of market interests.

2.3.2. Leasing

Leasing is a substitute for another type of indebtedness, i.e. it is a liability. Traditional accounting defines two types of leasing. According to the most commonly applied interpretation, financial leasing is an agreement in which the majority of the risks related to owning the asset are transferred to the lessee, while in the case of an operative leasing, these remain at the lessor. (Art. 3 and 50 of Act C of 2000) (For a detailed analysis of leasing see for example Copeland – Weston, 1992, pp. 614-637)

While financial leasings are normally accounted as if the company had drawn on a loan and then purchased the asset itself, the fee paid for an operative leasing is included among operative costs, and the balance sheet has no track of the transaction. This sort of regulation enables companies to keep certain debts outside the scope of the balance sheet, which Copeland et al. (2000, pp. 206-207) believe they regularly do. According to several surveys (Copeland – Weston, 1992, p. 632), since leasing is a very close but not perfect substitute of credit – some suggest it is more of a supplement to it, aiming at a sort of optimum combination – its utilisation depends upon the extent of the unused tax shield, the possibility of reselling the device and the economies of scale of the operating agreements. The surveys have also shown that leasing is usually decidedly more costly than funding from credit, which means that – if the profit expected from credit is used as a discount in the course of the

present value calculation – the liability in the balance sheet will increase more than if the company had purchased the asset from a loan.

Since the two types of leasing are practically identical from a financial point of view, the effects of an operative agreement should also be included in the balance sheet. This can be done through the inclusion of the discounted present value of future fees as credit, taking care to exclude the part of the leasing that covers maintenance, which should continue to be expensed. The purchased device is included on the asset side, and amortisation thereto is continuously accounted.

2.3.3. Not consolidated affiliated companies

On the liabilities side, significant difference may be the result if a company refers to some special accounting rule and does not consolidate an affiliated company with substantial debt it owns to a certain extent. Such items are included in the supplementary appendix of the annual report, if anywhere. In the case of this item, it is not so much valuation as revealing that causes the problem. (The Enron scandal that surfaced in late 2001 also cast light on this problem.) Among others, Benninga and Sarig (1997, p. 349) suggest that these items need to be included in the balance sheet.

According to Hungarian accounting rules (Art. 3 and 115-119 of Act C of 2000) that define a wide scope of consolidation, state that as a principle, it is sufficient to consolidate companies where the votes of the parent company exceed 50 percent in itself or on the basis of agreements made with other owners, or if it is entitled to appoint the majority of top managers, or if it has decisive control of the business.

2.3.4. Liabilities related to employees

According to the experiences of Pratt (1992, pp. 53-54), there often are liabilities towards employees excluded from the balance sheet. With respect to employees whose employment has already terminated, this usually means uncovered pension claims, paid holidays not used and particular unique benefits. These are covered by deferred debts in the Hungarian accounting system (Art. 44 of Act C of 2000).

In addition, there may be such labour or consulting agreements in place, on the basis of which the company has to pay a set amount of money at regular periods. In some cases, these agreements cover benefits given for previous works or had been undertaken by the former owner, and thus contribute to future performances only to a very limited extent, and their effect on the earnings should be included in the financial, rather than the operative part. Such may include the disability pension paid to an employee classified as disabled due to an industrial accident, which is to be paid by the employer throughout the life of the former.

2.3.5. Owners' loans

Blackman (1986, p. 57) points out that in many cases it is difficult to decide if the credit extended by owners should be considered as equity or credits. This largely depends on the aim of the valuation, since on a change in ownership, it is clear we must see these liabilities as debts, while in other cases there are only tax considerations behind this form of capital allocation, and there is no realistic chance or opportunity of withdrawal.

2.3.6. Pension funds

If a company has both covered and uncovered employee compensation programmes or pension funds, usually only the uncovered part is included in the statements as a liability. (This problem is only relevant with respect to the Anglo-Saxon pension system used outside continental Europe.) Instead, it would be definitely more realistic to include covered fund liabilities as foreign liabilities, and the appropriate coverage is accounted as assets. (Benninga – Sarig, 1997, p. 349.)

In addition, it is by all means to be verified that the funds in question are actually appropriately covered, that is, the assumptions made when estimating expected liabilities (growth rate of salaries, expected profit on assets) are realistic.

2.3.7. Deferred tax obligations

While certain accounting and legal systems (e.g. GAAP, United States) consider deferred tax obligations as a liability, i.e. an external source from an accounting viewpoint, as long as the money is not actually due, it is owned by the investors, who expect to receive profit on it, and thus these operate more like equity from an economic viewpoint. (Copeland et al., 1999, p. 196)

This correction assists the more accurate value estimation of not the company but rather the equity and the fixed capital, which, in turn, promote the reliability of the comparison of balance-based indicators. The significance of these items depends upon the local tax system.

2.3.8. Guarantee, warranty, product responsibility and undertaking sureties

According to the experiences of Brealey and Myers (1999, Vol. II, p. 348), quality responsibility is also a significant contributor. Barker (2001, p. 120) also emphasises the importance of this component, citing the example of the manufacturers of tobacco goods. In the United States, these companies had to pay enormous compensations in the past years on the basis of court rulings and settlements to smokers whose health has been severely damaged due to their habit. The expected costs related to responsibility have to be included among liabilities at their present value.

This problem is solved by Hungarian regulations through forming a provision (Art. 41 of Act C of 2000). The payment obligations originating from past and current contracts and transactions are to be included here if they are expected or sure to incur, but their amount or sue date is not certain at the time of preparing the balance sheet. Such items include guarantee obligations, early retirement, dismissal wage and certain payment obligations.

2.3.9. Environment protection obligations

The important role environment protection responsibility plays in the definition of value is pointed out by Brealey and Myers (1999, Vol. II, p. 348) and Pratt (2001. pp. 269-272). Barker (2001, p. 120) shares this view and quotes the example of the clearing of the contamination potentially caused by oil and chemical companies. Also, the expenses related

to the recultivation of mines and the neutralisation following the shutting down on power plants are to be considered.

Unless these factors are taken into account, the effect of strictly complying with accident prevention regulations or prevention measures and a well-organised emergency prevention system on value cannot be shown. (For further details on the effect of the above, see Section 3.)

If the risk of an accident and the extent of damage caused can be estimated accurately, optional pricing and scenario analysis may prove useful tools. In this case, however, the estimation of factors such as the future compensation payable for personal injury and casualties can pose a problem.

With respect to this problem, the Accountancy Act (Art. 41 of Act C of 2000) prescribes that all compensations and penalties known at the time of preparing the balance sheet are to be included among deferred expenses. In addition, in the course of evaluating the business, not only the payment obligations related to current events but also those arising from future contaminations are to be dealt with.

2.3.10. Litigation

Pratt (1992, p. 53 and 2001, pp. 269-272) points out that points out that pending and potentially occurring litigation may have a fundamental effect on the value of the company. These are to be considered as liabilities, estimating the probability of different possible outcomes and their respective effect on value.

2.3.11. Compliance with standards

It is also emphasised by Pratt that compliance with various standards is to be considered (Pratt, 1992, p. 53). Failure to comply with health, property and customer protection rules or fire and labour safety regulations will not only result in substantial penalties but may also lead to losing the operation permit. When drawing up long-term plans, we must not presume that there will be no costs related to the introduction and compliance with new standards. Since compliance with the standards is a crucial prerequisite to continuous operation, the costs

related to resolving any shortcomings are to be included in the balance sheet as liabilities (since they are inevitable).

Similar costs may incur if the company bases its strategy on the criteria of the quality assurance system it had drawn up itself or if it wishes to comply on a long term with the requirements of a quality assurance certificate – which is, in our days, an entry requirement rather than a competitive advantage in many markets. (Juhász, 2002b)

2.3.12. Special matters

The majority of the corrections made to the liabilities side are related to the valuation of various types of credit and share categories. These financial products may also appear on the assets side of the company balance sheet as fixed financial assets or extended loans, or on the liabilities side if they had been issued by the company or if it was the business in question that had availed of the loan. Certain corrections (leasing) affect both sides of the balance sheet. In other cases (expected liabilities), only the liabilities side is modified. In this case, the equity accounted is also to be changed in accordance with the alteration made to the liability.

The detailed valuation of various share categories is beyond the scope of this study: this only becomes necessary once value of the firm has been defined, and we want to divide it among different categories.

The valuation of purely financial assets that are not directly linked to the real sphere has extensive specialist literature, and most valuation tasks (at least in the case of a well-operating capital market) will pose no problem. This is why I will not go describe various methods. (For details see Bodie-Kane-Marcus, 1996; Hull, 1999; and Száz, 1999)

It is also a special case if the company owns an asset on conditions that are significantly different from the normal market environment. Credits received well below market price should usually be accounted as liabilities, divided into two. One of these should be the value of the liability on the basis of current market conditions and the other the added value due to the more favourable agreement. This item is likely to occur in the case of subsidised credits, and long-term rental agreements that are entered on conditions significantly more favourable than normally available at the time of execution.

The revision of the liabilities side of the balance sheet is intended to assist the determination of the value of company liabilities in a manner more similar to the business

approach. Deducting this amount from the asset value calculated from a business viewpoint will provide a corrected value of the equity, which is free from inaccuracies resulting from actual company assets.

2.4. APPLICATION OF CORRECTIONS

Albeit the last 10-15 years have seen the publication of numerous books and articles on the problems of valuation and possible correction methods, a survey quoted by Graham Francis and Clare Minchington (in: Arnold-Davies, 2000, pp. 150-162) concludes that companies (in the United Kingdom) are hardly concerned about this problem. (Survey conducted in other Western countries in the late 90s came to similar findings.)

Experience shows that daily management was hardly affected by specialist literature. This may be due to the fact that the practical significance of corrections deemed lower than the costs of application. The methods used for the measurement of invested capital are summed up in table 10.

Distribution of valuation methods used for defining the capital invested in the given business unit

Net book value	87 percent
Replacement cost	4 percent
Gross book value	3 percent
Market value	1 percent
Other	5 percent

Source: Arnold-Davies (2000, p. 159)

Table 10

This shows that although companies use a wide range of corrections during the sale and purchase of businesses, in the course of the valuation of operating performance, there are only a few yet who apply the discussed corrections that would ensure not only the more accurate estimation of value of the firm but also of the invested capital. This is probably due to the diversity of corrections and their significant time and information requirements.

It is interesting, however, that the measurements concerning intellectual capital as described in Section 3 are performed by a much wider group of companies. According to the findings of a survey conducted in 1998, for instance, 75 percent of the companies involved used some sort of indicator to trace their intangible assets, hoping to increase their operational effectiveness. (Bontis, 2001a) This leads us to believe that while companies conduct the necessary measurements and make the necessary estimations for different reasons, the results do not reach the level of investment decision-making.

On the basis of the above, it seems that companies are far from utilising all the knowledge available to them in the course of their everyday operations. Although they are in some cases familiar with the appropriate valuation techniques, they do not apply in them in everyday company management. There are several possible reasons for this. Perhaps the companies themselves do not have the necessary information, and they only avail of the assistance of external consultants in very justified cases. It is also possible that the required approach is applied in-house, but they do not recognise its significance in everyday administration, or they deem its advantages less than the cost of gathering the information required for their application.

3. SOURCES OF ADDED VALUE OF THE FIRM

According to modern corporate finance, the value of the business increases if it is capable of creating a combination of factors in the real sphere that generates income in excess of the alternative cost of the capital. This means that the company generates added value by implementing investments with a positive net present value (exceeding capital costs). (See among others: Brealey-Myers, 1999) The acquisition of ownable assets in itself does not increase the value of the company, the added value is only created as an effect of the combination of suitable factors.

According to Chikán's definition (1997, p. 464), synergy is the measure of the joint effect that derives from the fact that the whole is more than the sum of its parts. In line with this definition, added value can be identified as the synergy of company assets.

The synergic effect only needs to be defined separately if the purpose of the valuation is to support an acquisition or merger, where the added value generating effect of the assets of the purchasing firm to be identified at the acquired company after the transaction. The value can be specified the most easily by comparing the values of the individual companies and that of the new, integrated organisation.

There are various views in specialist literature concerning the definition of the synergy and the identification of its components. Barker (2001, p. 109) calls it an element of goodwill that the value of the sum of the parts is more than the sum of the values of the parts. Haspeslagh and Jemison (1991, p. 12) emphasise in connection with the effects of acquisitions that the purchase itself (or the extension of company activities) does not generate value in itself, only if an advantageous connection is established between particular components. Such a relationship is called synergy (as quoted before, p. 22). The authors claim integration means only the acquisition of new capacities, but value is only generated by the ones that create a competitive advantage (as quoted before, p. 28).

The authors identify four groups of basic factors that provide a competitive advantage (sources of synergy) (as quoted before, pp. 29-32). (1) *Combination advantage* comes from the increased size due to the expansion and extension. The bargaining power of the company may be strengthened with respect to suppliers and customers, the reputation and attractiveness as an employer may increase, financial stability can improve. (2) *The advantage of shared resources* originates from the sharing and the multi-purpose and thus more effective

utilisation of the resources aimed at generating value (productive assets, workforce, intellectual capital). (3) *The transfer of functional capacities* means that business units share the abilities developed independently by means of knowledge transfer. (4) *The transfer of general management skills* helps improve the effectiveness of the management of individual fields.

Shapiro and Balbirer (2000, pp. 378-380) define five groups of synergic effects. (1) Economies of scale, (2) access to markets, (3) integration of excellent management skills, (4) increased market power and (5) acquisition of new technologies as well as their universal application within the company may all result in synergy.

These factors can hardly be evaluated independently, although such synergic effects may in part be reflected in the price of the purchased company (division), and thus in the accounted goodwill, depending upon the applied accounting technique. Grasping and evaluating this is, however, extremely difficult. It could be done by taken the difference between the asset value computed in the course of a comprehensive revaluation and the fair market value. Since the valuation of assets is prepared to support the definition of the fair value in most cases, the end result would be needed during the calculation.

Baruch (2000) points out that even this method would be imperfect, since a technology is of no value unless the company can utilise it. Similarly, when defining the fair asset value, it is assumed that the company has the ability of appropriate purchasing and sale, and thus some of the profits generated by intellectual capital are allocated to the asset in question. Estimations can be made, for example by comparison against other companies, but in this case no goodwill can be accounted in the balance sheet, since all components thereof have been included elsewhere.

Specialist literature claims that one of the most important components of synergy is diversification, which may result in the reduction of company-specific risk. This is the part of the synergy generated if the company utilises its usually available resources in more than one fields at the same time, which reduces its dependence on a given field of activity, market or product, i.e. its operating risk.

The source of added value of the firm is defined differently by various authors. (The most common divisions are described in Section 3.1.) According to the categories accepted by most authors, the quasi assets identified as intellectual capital can be divided into two groups: items linked to the organisation and items related to human resources. The elements of these groups are discussed in Sections 3.2. and 3.3., respectively.

3.1. HANDLING INTELLECTUAL CAPITAL

There have been several attempts at explaining the sources of the difference between the value of the firm (Section 1) and the fair value of the assets that can be independently evaluated (Section 2), that is, the added value of the firm. Almost each function tried to demonstrate that the sometimes rather significant difference is due to the factor in question. Some authors claim that the entire excess is due to human resources (Standfield, 2002, pp. 124-125), others credit it to strategy (Day, 1990, p. 336), research and development, growth opportunities (Black et al., 1999), management (Strassman, 1990, pp. 88-89), permanent competitive advantages (Kay, 1993, pp. 206-210) or customer value (Sargeant, 2001). The majority of researchers, however, believe that the difference is the total value of intangible or intellectual capital (intangible assets is used occasionally in the same sense) (Standfield, 2002, p. 48), which – according to most definitions – also includes the above items.

The added value of the firm comes from factors that are closely linked to the company but cannot be sold separately. There can be at least two reasons for an item to be classified in this group: (1) the factor in question is not owned by the company and cannot consequently be sold (management, employees), or (2) the given factor is inseparable from the company, and therefore cannot be sold in itself (strategy, growth options, organisation, contracts). Specialist literature refers to the total of these factors as intellectual capital (IC).

The valuation of intellectual capital is by no means an easy task. According to the surveys of Coff (1999), the negotiations concerning mergers and acquisitions in knowledge-heavy industries last more than the average, and its is common for the customers to settle a smaller part of the purchase price in cash than the average in an effort to share the risk underlying the companies (and the valuation). His findings show that premium above former market price is also lower than in other industries.

The significance of this group of assets is illustrated by the estimation of Interbrand. (Table 11)

Significance of intangible asses in various industries

percent	Tangible assets	Intangible assets
Financial services	20	80
Luxury goods	25	75
Information technology	30	70
Pharmaceuticals	40	60
Food	40	60
Vehicles manufacturing	50	50
Public utilities	70	30
Industrial goods	70	30
Retail	70	30

Interbrand estimation, based on Doyle (2001)
Table 11

Some authors (Thaker, 2001; Standfield, 2002, p. 48) consider the difference of the book value and the market value of the equity (or the company) as intellectual capital. As seen above, this can be accepted as a very rough estimate at best, since they ignore not only the difference between the book value and market value of the assets included in the balance sheet (which may be significant with a high inflation rate), but they also fail to consider the effects of the funding agreements and financial products excluded from the balance sheet. They also ignore that the purchased components of intellectual capital are already included in reports at a certain value.

Lynn (1998) approaches the problem from the assets side, and divides company property into three parts: tangible assets (buildings, equipment and stocks), financial assets (cash, investments, customers) and intellectual assets (as well as the capital invested therein). The concept of business enterprise value (BEV) is the result of a similar approach. This term usually refers to the difference between the fair values of the tangible assets and the entire company. (Wolverton et al., 2002)

3.1.1. Identification of intellectual capital

According to the OECD directive issued in 1999, intellectual capital consists of two parts: structural capital (including synergy) and human capital. (The same division is used among others by Sharma (2001), Bontis (2001) and Fernández (2002, p. 584).) Several authors, among them Amram (2002, p. 171) believe that the value of the activities that require specialist knowledge (R&D, special services) should also be included here. Assessment and

practical application, however, are rather difficult partly because the knowledge required and the special group of tangible assets are indivisible, and can usually only be evaluated together. Baruch Lev claims that tangible assets in themselves do not generate value (Gross, 2001), therefore all excess can be allocated to intellectual capital. This can only be accepted if the application of the principle is restricted to standardised assets produced in series that are easily available on the market.

According to another type of division (Mayo, 2000, and Dzinkowski, 2000) intellectual capital is made up by customer capital (customer relationships, market share, image, brand names), structural capital, (Dzinkowski calls it organisational capital) (processes, patents, databases, know-how, culture) and human capital (expertise, team work, motivation, leadership, know-how). There are also various definitions of structural capital. Most authors mean intangible assets that *cannot be linked to a particular employee* by structural capital. According to Mayo, this group is made up by factors that "stay when workers go home", i.e. he contradicts Dzinkowski who uses the same division and classifies structural hierarchy as human capital, but believes that knowledge (most probably recorded in some form) is part of the structural capital.

Brooking (1996)[12] (quoted by Bontis, 2001) divides intellectual capital into four parts. (1) Market assets and intangible assets contributing to the evaluated performance: brand names, customers, distribution channels, licences and franchise rights. (2) Human assets comprise structural creativity, problem-solving abilities, drive and leadership skills, while (3) the assets related to intellectual property are know-how, business secrets, patents and logos. The author defines (4) infrastructural assets as the total of technologies, processes, company culture, risk management, databases and communication systems.

Oliver (2001) defines shareholder value as the sum of four intellectual capital factors. (1) Customer equity means the relationships maintained with customers, (2) brand equity represents the market strength of the products and services of the company. (3) Public equity covers the value originating from the ability to operate independently of the effect of the public opinion and the (statutory) intervention of the state. (4) Human equity is generated by human capital and employees' talent. The primary role contacts play in generating value is emphasised by Srivastava et al. (1998). (From now on, I will refer to the division set up by the OECD, which the majority of authors also accept. A summary of various divisions is given in Chart 4.)

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[12] Brooking, Annie (1996): Intellectual capital: Core assets for the third millennium enterprise, Thomson Business Press, London

Various divisions of intellectual capital

OECD, Sharma, Bontis, Fernández	Mayo, Dzinkowski	Brooking	Oliver
Organisational structure	Structural capital	Infrastructural assets	Public equity
	Customer capital	Market assets	Customer equity
		Assets related to intellectual wealth	Brand equity
Human resources	Human capital	Human assets	Human equity

Chart 4

The significance of intellectual capital components that cannot be evaluated independently is illustrated by the fact that a survey conducted by Cap Gemini – Ernst & Young in 1997 showed that an average of 35 percent of investor decisions are not made on the basis of financial data in our days. (James, 2001)

Haspeslagh and Jemison (1991, pp. 23-27) define business as the total of skills that generate competitive advantage (in Doyle's model: relative advantage) if combined appropriately in the market. (Aaker (1991, p. 13) argues along practically the same lines when defining the company as the sum of assets and skills.) Competitive advantage is generated by the skills that (1) represent management and technology skills, (2) can be acquired mainly through experience, (3) significantly contribute to produces customer value and (4) can be widely used in business fields of the company. Added value of the firm can only originate from such skills, which, due to requirements (1) and (2) are practically exclusively linked to intangible assets.

In his discussion of the problem from the management's side, Knight (1998) claims that generating value can be described in the triangle of strategy – finance – conduct. His model can be interpreted as the description of the relationships between the intellectual capital financially measured (or measurable) and those related to the organisational structure and to human resources. Accordingly, "connection" between various types of assets are created by value management, performance measurement and the incentive system, all sharing the common goal of maximising value.

According to the theory of Reichheld and Teal (1996), value is actually generated by loyalty. This can be measured in three dimensions, (1) regarding customers, (2) employees and (3) investors. (In Knight's transformed model: the strategy representing the attitude towards customers, the conduct describing the treatment of employees and finance that accounts the benefits provided to investors all contribute to the maximisation of value.)

Companies in the United States (Reichheld-Teal, 1996, p. 1) lose half of their customers in five years, half their employees in four years and half of their investors in less than a year. They believe the most important source of generating value is thus lost, and performance may fall up to 20-50 percent.

They believe the three types of loyalty are mutually interconnected: customers can hardly be kept with a quickly transforming staff, and if customers are not kept, it is impossible to secure returns that encourages investors and causes the price of the shares to rise.

In this model, the primary task of the company is to generate value for its *customers*, which leads to growth and an increase in value, and also becomes evident in cash flow. They argue that the loyalty of customers will not only help reduce the costs related to the maintenance of the customer base but also to the expansion thereof: a satisfied customer brings new ones, they know the product and therefore utilise the customer services of the company less, they are less sensitive to the price and purchase more, without any extra costs. The extent of possible savings is illustrated by the findings of a survey conducted in the United States, which show that companies spend up to five-ten times more on acquiring new customers than on keeping old ones (Thurston, 2001), although acquiring a new customer costs at least five times as much as keeping an existing one. (Srivastava et al., 1998)

A stable *staff* saves the expenses of regular recruitment, selection, hiring and training, the employees are experienced and thus more effective and also have valuable personal contacts. Loyal employees may bring new customers and similarly well-qualified staff members to the company.

The importance of staff treatment is emphasised by O'Reilly and Pfeffer (2000). They believe that human resources can (and must) be used to forge competitive advantages. This requires strong culture, the hiring of the appropriate persons, investments in employees (training), sharing information on a wide scale, team system, suitable premium and compensation system (not solely money-based), and a team of executives who want to lead instead of managing. This also means that these factors cannot be evaluated separately from human resources, since the major part of their value becomes apparent in the performance (or loyalty) of employees.

The damage caused by unsuitable *investors* is explained by Reichheld and Teal, who argue that the frequent sales and purchases of shareholders only focussing on the short term increase the volatility of the share price, along with the related risk and expected profit. Therefore, the capital costs of the company increase, and it will only be capable of generating less value. This is why the companies owned by strategic investors optimising on the long

term are in an advantageous situation concerning the generation of value due to their lower cost of capital (as quoted before pp. 153-183).

Vandermerwe (2000) claims that businesses should not strive to sell the greatest possible amount of their primary products, but should rather concentrate on increasing the amount their customers spend at the company. In order to do this, customer value needs to be generated, rather than products manufactured. In this case, it is not the product or the technology (high changeover costs) that generate customer loyalty but the interest of the customer, which leads to a relationship that is more permanent than previously. This line of thought could best be summed up by establishing that in the course of improving its outputs, the company should not apply its own (money-based) value concept but rather the customer approach, which is based on profitability and is thus subjective.

The importance of customer value is also underlined by the survey of Aaker and Jacobson (1994)[13] (quoted by Cravens – Guilding, 2001), which showed a positive relationship between the perceived quality of the products of the company and the profit on its shares. Barth and Clinch (1998) had similar findings when examining the relationship between the market value of intangible assets and share prices. Even Koller (2001), who claims that cash flow is the primary factor, has to admit that the customer value concept helps managers understand where shareholder value originates from.

3.1.2. Measurement possibilities of the intellectual capital

Turner and Jackson-Cox (2002) identified three reasons and goals of the assessment of intellectual capital. The reasons are (1) the improvement of the management of the capital invested in people, (2) the identification of the companies with increasing and decreasing intellectual capital, and (3) the requirement to measure long-term returns of the intellectual investments of the company. Such measurements make it possible to focus resources in areas promising better returns, and also help the company acquire, generate and keep the intellectual capital components it actually needs, while continuous tracking may draw the attention of the management and funders on this asset group. Sveiby (1997)[14] (quoted by Bontis, 2001a) suggests that what a company needs is not a measurement system, since

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[13] Aaker, D. A, - Jacobson, R. (1994): The financial information content of perceived quality, Journal of Marketing Research, 31 May 1994, pp. 191-201.

[14] Sveiby, K. E. (1997): The new organizational wealth: Managing and measuring knowledge-based assets, Barrett-Kohler, San Francisco

supporting management decisions requires a quicker and less detailed process even if it is less accurate.

This view is shared by Marr (2003), who believes that the most important result of measuring intellectual capital is that its various components are identified in the process, and thus their effect on value-generating become clearer. He believes there is no point in sticking to the practice of allocating a financial value to each element of the intellectual capital.

When considering the problems of accountancy assessments in Section 1, it has already been shown that one of the most significant barriers is measurement in money. The principle of company operation is that it transforms various resources in a manner that their combination fulfils the requirements of the customer and thus represent greater value than the sum of the parts. While the tool of measuring value outside the company (and economy) is not (solely) money, accountancy can only accept the entered resources and shows only the profits that can me measured in money. In recent decades, however, the significant of the components whose financial assessment is not or only partly possible has increased substantially, such as liabilities, products and services.

On the output side, a company uses external parties to perform the financial valuation of its various issues by purchasing the products at a certain price or providing subsidies for its useful operations (R&D, creating jobs) and assessing penalties for harmful acts (breach of contract, pollution). The underlying assumption is that (1) feedback is received on all issues and (2) the relative financial weight of feedback results reflect the relative usefulness of company outputs (product, service, contamination, sponsorship). The fact that the case is not at all like this is illustrated by the problem of imperfect information (unhealthy products, deceitful adverts) and external factors (contamination, lobbies).

On the input side, the similar valuation of external influences is performed by the staff. Their task is to convert the values of purchases that cannot be measured financially, such as to assess the expected performance reliability of a supplier or sizing up the creativity of a new employee. In practice, it is impossible to perform the conversion accurately. The valuation model built in part on the basis of the above and in part reflecting the notes of Doyle (2001) and Nordhaus (Rohwer, 1999) is shown in Chart 5. The majority of intellectual capital components can actually be described as part of a party contact, as suggested before by Oliver (2001) in a different context. (See the possible divisions of intellectual capital.)

Out of the relationships introduced above, accounting statements only include those recorded in money, while physical characteristics are included in an analysis. Where causality exists between the financially measurable and physically measurable changes, accounting

records money flow as the consideration for the physically measured transaction. Intellectual capital cannot be fit into any approaches, however, since it is not measured directly in terms of money (except for the sale and purchase of intellectual capital components), and it can be hardly measured physically due to its intangible nature.

The difference of the assessment of intellectual capital is caused in part by the uncertainty of the related future income and expenses and the definition of causality, and in part by the fact that value cannot be expressed directly in terms of money, and an indirect expression is highly inaccurate. The customer judging on product level in the best case, considering only individual usefulness does not know even him/herself what role the reputation of the manufacturer, the attractive packaging and the price played in his/her purchasing the product.

Also, the clearly personal and subjective aggregation of value raises new problems. Lynn (1998) points out that in the course of defining intellectual capital value that cannot be determined directly, the application of various proxies may result in substantial inaccuracy. In conclusion, if we try to assess the value of a company using only the tools of accounting, it is like attempting to determine the length of a shadow with a thermometer in order to find out what time it is: an inappropriate tool is used for a characteristic that is inaccurate to a variable extent (depending upon environmental conditions), and the result is then used in complex calculations that are very sensitive to input factors.

Value measurement systems in business operation
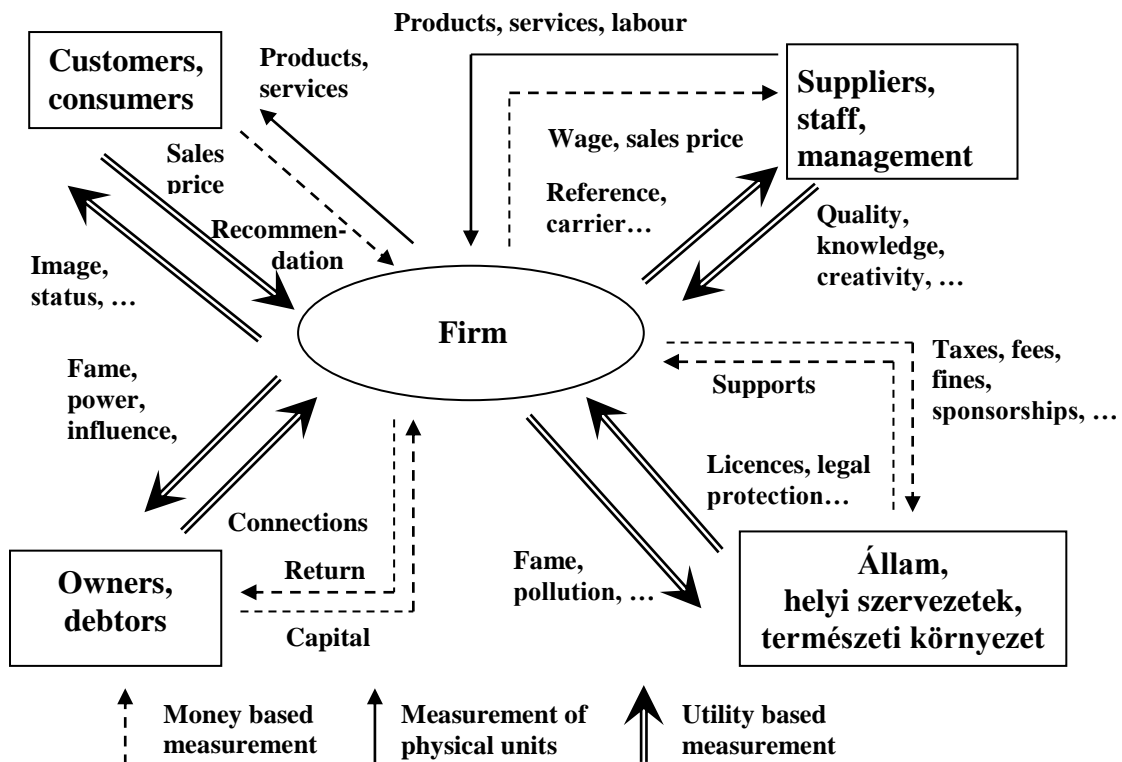
Chart 5

Due to the above difficulties, two methods of measuring intellectual capital can be identified. One of these "schools" emphasises the importance of *defining value*, and uses methods referring to financial measurement, which are less accurate but well manageable. The experts wishing to show the *change in value* consider physical characteristics rather than financial indicators, and set up a sort of inventory without the intention to compare the values of individual assets. This duality is present in current-day company records, since analytics, based on physical considerations and accounting that only measure in terms of money operate parallel. On this basis, it is justified to assume that the final solution for the measurement of intellectual capital may be the application of two parallel and mutually complementing approaches.

Views differ not only concerning the goal and method of measurement but also regarding the necessary frequency. Baruch Lev (Gross, 2001) claims that the value of all intangible assets needs to be revised only every 3-4 years, while the majority of authors discussing measurement champion continuous racking and annual assessment. The cause of the difference usually lies in the level of detail in the measurement. It is commonly accepted that

frequent measurements are only required with respect to the assets that play a dominant role in the generation of value at the company, while the values of other asset types tend to change at a much slower rate due to their secondary importance, therefore a comprehensive assessment of these is to be carried out with less frequency. Thus, the manufacturers of consumer goods have to focus primarily on their brand names, pharmaceuticals on their research and development (James, 2001), consultants on the human resources and company reputation and a media company on the talent and creativity of its employees as well as public reception.

Sharma (2001) believes that the valuation of intellectual capital, regardless of the purpose, measurement unit and frequency, is to be performed considering five rules. (1) An organised and centralised measurement and the organised presentation of indicators is always more successful than publishing findings in a scattered manner. (2) Indicators are to be interpreted together with the variables describing the relevant business environment, and special attention is to be paid to differentiating between the rate usable by particular business units and on a company level. (3) Although innovative indicators may grasp a number of unique characteristics, we must not cease to apply their traditional counterparts, because those will make the relationships between business units by far more transparent. (4) The presentation of the changes to the indicators as a function of time is by far more useful than simply publishing the actual value of the indicator in question. (5) Rather than applying unique indicators, it is better to define measurement units that can be compared to data from other companies.

Sharma (2001) divides the methods developed for the measurement of intellectual capital into three groups on the basis of their approach. (1) In the *Direct Intellectual Capital* (DIC) method, the intellectual capital is broken down to components, and parts are assessed separately. (2) *Return on Assets* (ROA) models divide the standard earnings of the company by the average value of tangible assets and compare the result to the industrial average, then capitalise the profit in excess of the average and provide an estimate of the amount of the total intellectual capital. (3) *ScoreCard* (SC) systems define individual indicators for the description of various components of the intellectual capital, and show the trends in the value of intellectual equity through the changes thereto. Their approach is similar to that assumed by DIC systems, but it is a significant difference that the goal is not the definition of value in terms of money.

Dzinkowski (2000) defines three classical ways of measuring intellectual capital: the ratio of market and book values (market-to-book value), the Tobin q indicator and Calculated Intangible Value (CIV) method.

According to the *naïve version* of the intellectual capital value estimated on the basis of **the market-to-book value,** as accepted by Dzinkowski, the value of the intellectual capital is identical with the difference of the market value and the book value of equity, thus any rise in the ratio reflects the increase of the intellectual capital. This rate ignores, however, the difference of the asset value from the figures recorded in the books, any accounted goodwill, which also contributed to the intellectual capital, and he changes to the market value of liabilities. The *corrected version* takes into account the above and compares the market value of equity to the equity value computed on the basis of the fair value of recorded assets and liabilities, which is calculated by deducting the IC components included in the books.

Tobin's q indicator. This indicator was introduced by Nobel-prize winner James Tobin in 1969, and was originally aimed at forecasting investment decisions. The value is the ratio of the market value of the company and the total replacement cost of its assets. If q is above one, the company is generating profit above the average for some reason – it creates value. On this basis, analysts have traditionally used this indicator to forecast a price drop if below one, and an increase in the price if above that level – and to rely on the principle of efficient markets in doing so.

Although many use the book value of assets as a basis for the computation of the indicator, Klock and Megna (2000) showed in their analysis of the wireless telecommunications market that a q indicator calculated solely relying on accounting data gives a misleading and false picture. In a previous article assessing semiconductor manufacturing (Megna-Klock, 1993), they concluded that the intangible assets covered in the analysis do not serve as comprehensive answer to the differences of the q ratio. (Possible underlying factors include the synergy of assets and different growth prospects.)

Calculated Intangible Value (CIV). In this method, which was developed by NCI Research, the IC value is estimated by taking the average return on assets (ROA) in the industry in question in the previous year to define to what extent the profit of the company exceeded "expectations", and then consider the difference capitalised with the expected profit rate as the value of the intellectual capital (Dzinkowski, 2000). This method also falls into

group (2) according to the classification set up by Sharma, and should be considered as naïve method.

In order to get a realistic result, returns is to be assessed on a cash flow basis, and the total book value of assets is to be considered at it fair market value. Also, it is the extra (standard) cash flow expected to be continuous on a long term that should be capitalised, considering whether it would be better to refer to an annuity equal to the average lifespan of the high number of intellectual capital components with a limited lifespan.

The method proposed by Barett (1986) for the valuation of inseparable intellectual capital components is based on a similar principle. In the **residual earnings-based method**, the individual valuation of separable items and the costs of the development of intellectual capital remaining after their inclusion in the balance sheet (the costs of not independent intellectual capital components – costs required for keeping the same level) would be capitalised first, then the expected residual earnings of the company would be defined by including the amortisation of this equity in the computations related to the forecasting of future cash flow. (A similar solution is offered by Pratt (1992).) He suggests that the present value of expected *positive* residual earnings should be considered as part of the indivisible intellectual capital. The weak point of this idea is that depending on the method used for the valuation of the rest of the assets, this method would lead us to credit to this group also the residual earnings generated by the capital invested not in intellectual capital assets. Herz et al. (2001) stress that in this approach, the valuation inaccuracies of tangible assets would also affect the value of intellectual capital.

Ehrbar and Bergesen (2002) suggest practically the same method 16 years later, with the exception that they take capital cost-based return as the basis with respect to the book value of company assets excluding goodwill, and credit all excess above this amount to the total intellectual capital (they do not separate individually identifiable and assessable intellectual capital components). On this basis, the book value would reflect realistically the (earnings-based present) value of the assets accounted (which means that all corrections seen in Section 2 would be rendered unnecessary), while the excess amount would practically be the economic value added (EVA) (residual earnings). Accordingly, the present value of future EVA's would give the realistic value of the intellectual capital. (For more details on added economic value, see Section 3.1.4.)

The measurement method proposed by Baruch also belongs to the group discussed before (Price on the priceless, 1999 and Mintz, 1999). According to this, the standard average profit of the company estimated on the basis of the market data of the company's tangible and

financial assets (realised and expected) is to be deducted from the standard earnings forecast on the basis of near past and the near future, then the remaining "knowledge-based earnings" – as an approximation of the earnings expected from these assets – should be capitalised taking into account the average profit of three knowledge-heavy industries (software manufacturing, biotechnology and pharmaceuticals) to give "knowledge capital", that is, intellectual capital value.

In their criticism of this concept, Rouse and Boff (1999) point out that the profits on tangible and financial assets can in practice be hardly separated. When referring to average industry profit, it is assumed that the company is as good in this field as other companies, which is not at all justified. It is also unacceptable to simply credit all earnings that cannot be explained otherwise to knowledge-based assets. They also stress that in such concepts, intellectual capital value does not grow if an investment such as a research and development project or the further training of employees is implemented, albeit these are traditionally seen as having a positive effect on intellectual capital. Finally, they emphasise that the objective of the valuation is not to divide value of the firm but to enable decisions on the implementation of certain projects, on the basis of expected profits. The above approach does not, however, serve this purpose. (As we have seen, another goal may be the tracking of changes, for which the method discussed is in theory suitable.) The authors suggest instead an approach based on the individual profitability functions of the affected parties, but they fail to specify the method of defining functions.

DCF model. Srivastava et al. (1998) – keeping mainly assets related to marketing before their eyes – present a theoretical framework for the valuation of unique intellectual capital components. The principle of the proposal is that the value of intellectual capital components can be specified by examining what effect they have on particular factors of a DCF model assessing the entire value of the firm.

With a few changes and additions, their suggestions show that intellectual capital components can increase value of the firm in the following ways:

1. Increasing cash flow
2. Hastening cash flow
3. Reducing the risk related to cash flow
4. Reducing capital requirements
5. Increasing remainder value

The above five effects are accomplished by various intellectual capital components in diverse ways, and it is rather common that a given intellectual capital component causes more than one effect. Increasing cash flow is feasible by increasing price or the price margin (brand names, loyalty, high change over costs), by increasing the volume of sales at the same rice and cost levels (better distribution network, umbrella brands), by the reduction of expenses (stock management processes, advanced technology), or acquiring new markets and products (R&D, contacts).

With respect to hastening cash flow, three types of effect can be identified. The popularity of brand names may make customers more sensitive to advertisements, thus (1) not only is the effect of the same campaign larger but it is also realised earlier. (2) Faster development, better logistics and distribution networks and sales contacts lead to shorter time-to-market, and have a similar effect. Strategic alliances synchronising market appearance (3) may shorten the time required to adapt to market changes.

The risk underlying the uncertainty of cash flow volumes is reduced for instance when customer loyalty is established and trust in the products of the company can be forecast better and lead to more even sales. Srivastava et al. (1998) believe that the existence of market entry barriers (Porter, 1993) and effective exchange of information within the distribution chain also have similar effects.

The reduction of capital requirement can be secured by decreasing current capital demand (stock management, customer and supplier contacts), and by utilising invested capital more effectively (planning production and moving, reducing downtime). The remainder value can be increased by improving growth rate sustainable on a long-term (loyal customers, image), and the permanence of competitive advantages.

3.1.3. Measuring intellectual capital in practice

The first to attempt to measure intellectual capital was Skandia, an insurance and financial services company measuring intellectual capital within the business since 1985, who developed the Skandia Navigator system in the early 90s. The works were headed by Leif Edvinsson, the intellectual capital director of the company appointed in 1991. (Stewart, 1994) The report developed under his leadership presenting changes in company intellectual capital became a standard attachment to statutory accounting statements in 1994. Many have

followed the example of Skandia, and already in 1996 there were 43 Swedish companies that supplemented their financial report with the data describing changes in the intellectual capital. (Lynn, 1998) Not much later, the Danish ministry of Commerce asked twenty companies to prepare reports on the changes in their intellectual capital for three years, which would hep establish points of reference. (A price on the priceless, 1999)

In the Skandia model intellectual capital is measured along five dimensions: the tools applied target (1) finance, (2) customers, (3) employees, (4) processes and (5) renewal and development. The purpose of the model is not to define value in terms of money but to track changes in the intellectual capital. (Bontis, 2001) The system applies 91 various and newly defined intellectual capital indicators in addition to another 73 based on traditional units of measurement.

The complexity of the task is well illustrated by the fact that even the *simplified* model developed by Edvinsson and Malone[15] (quoted by Bontis, 2001) in line with their criticism of the Skandia system for applying numerous redundant elements contains 112 indicators. The Balanced Scorecard created by Kaplan and Norton (1996) in 1992[16] was in part created on the same basis and as a means of simplification, similarly to the Value Reporting[17] system of PricewaterhouseCoopers (Maines et al., 2002).

In the United States, Dow Chemical was the first to measure intellectual capital in 1993. (Lynn, 1998). The principle of the system was much rather assessment, setting up an inventory of the intellectual capital than to evaluate or trace. The mere identification of available, potentially independently valuable and separable assets was sufficient to draw attention to the underlying assets, and the sale or letting out of components deemed unused brought substantial economic profits.

Since the early 90s, numerous experts have studied the relationship between financial indicators and market prices. In their revision of these researches, Maines et al. (2002) claim that in most cases only the fact of a connection of a variable strength was evidenced, but the direction of causality is in most cases questionable at best. It also seems obvious that non-financial indicators that are related to the share prices (value) of every company cannot be identified, therefore the authors suggest that the companies should not attach the values of

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[15] Edvinsson, L. – Malone, M. S. (1999): Intellectual capital: realizing your company's true value by finding its hidden brainpower, Harper-Business, New York
[16] Kaplan, R. S. – Norton, D. P. (1992): The balanced scorecard-measures that drive performance, Harvard Business Review, January-February 1992, pp. 71-79.

predefined indicators to their annual report but rather the rates they deem as related to their financial performance. (This proposal is in sharp contrast with the (5) accounting guideline of Sharma (2001) seen above, according to which companies should use widely comparable indicators rather than unique values for the measurement of intellectual capital.)

Intellectual capital-index systems were introduced in the mid-90s. (Bontis, 2001a) These attempted to contract the results of the exhaustive measurements of ScoreCard systems into a single figure. The goal was in all cases to create an indicator that would show close relation not only to the changes in intellectual capital value, but (mainly) to its contribution to company performance. Attempts were made to attain this objective by indicators applied in diverse dimensions (usually only reflecting change and without a measurement unit) and finding the optimal weighing of measured results. Since the final figure reflects the relative importance originating from the characteristics of the given company, and no measurement unit is used, there is no point in comparing actual results against each other. For this purpose, the change in the value of the computed indicator is to be used.

In the last years of the 90s, value estimation methods connected to residual earnings and shareholder value were first introduced, which do not draw conclusions regarding the generated value on the basis of the changes in intellectual capital, but instead try to use the appropriate allocation of the added value calculated on the basis of financial and market data to tangible and intangible assets in an effort to demonstrate trends in intellectual capital. (See the already discussed methods of Ehrbar and Bergesen (2002), and Baruch (Price on the priceless, 1999 and Mintz, 1999).)

According to a survey conducted by Arthur Andersen in 1998, the majority of companies expected an increase in the importance of intellectual capital, 75 percent have already used a few non-financial indicators to measure them, since they believed this would help enhance their organisation effectiveness (Bontis, 2001a). On the other hand, most companies are far from being eager to publish their measurement results. Huseman and Goodman (1999)[18] (quoted by Bontis, 2001a) examined the largest US-based companies and found that although

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[17] For details see: Eccles, R. – Herz, R. – Keegan, E. – Philips, D. M. H. (2001): The value reporting revolution, John Wiley & Sons, New York

[18] Huseman, R. – Goodman, J. (1999): Leading with knowledge, Sage, London

66 percent of the businesses measure intellectual capital in some way, only 15 percent include it in some form in the financial reports.

The relatively high rate of measurements does not mean, however, that the applied systems are comprehensive. The measurement of innovation, for instance was deemed necessary by 63 percent of the 253 North American companies examined by Covin and Stivers (1998)[19] (quoted by Bontis, 2001a), but only 14 percent actually measured it in some way, and a mere 10 percent used the result during making its strategic decisions. The situation is no better with respect to brands: a study quoted by Bartram (2000) suggests that 18 percent of the companies measure the effect of intangible assets related to marketing.

The corrected value of assets and the business value of companies are not identical. The difference is credited to the existence of intellectual capital, whose most important characteristic is that the factor is not owned by the company but is indivisible therefrom and affects its value in a fundamental way.

Numerous models have been created to aid the identification of intellectual capital. In the generally accepted system, components are either related to the organisational structure or human resources. While these factors play a significant role in making investment decisions, there is no universal model for their measurement in place. Various fields (finance, organisation management, marketing, strategy) use independent models, including only the system components relevant for their purposes.

As a result, there is no universal solution for the measurement of intellectual capital components, the selection is made on the basis of the assets of the professional field in question. This is not necessarily a disadvantage, since intellectual capital is so inhomogeneous by nature that the development of a universal measurement system seems impossible and uniqueness, which is the major value of these items, would presumably be lost in the process. This means that the result would only be a more complicated *and* les accurate system. On the other hand, specialised measurement methods often lead to multiple recording, therefore special care is to be taken to remove redundancies after the individual valuation of components.

During the measurement, it often happens that the expression of the given value in terms of money is possible only greatly inaccurately or not at all. The exerts supporting ScoreCard systems claim that financial assessment is not necessarily needed: the changes in particular

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[19] Covin, T. J. – Stivers, B. P. (1999): Knowledge and innovation focus: a classification of US and Canadian firms, International Journal of Technology Management (20), pp. 500-509.

capital components can be traced in other ways as well, which may be sufficient for tracking and managing value of the firm generation, and may serve as a point of reference in a comparison.

While various measurement tools have been in use since 1985, surveys suggest that companies do not publish their results, thus these pieces of information are normally not available to anyone but the company management. Furthermore, in the majority of cases, measurement results are not even utilised by the management that have access to them.

Components of intellectual capital

The methods discussed so far offer solutions for the general valuation of intellectual assets (usually altogether). The major part of intellectual capital is, however, made up by assets and groups of assets that are separable and can be evaluated individually, (brand names, rights, logos, research and development). The relevant valuation methods and difficulties (market-, cost and earnings-based methods) have been discussed when dealing with the correction of the balance sheet, therefore I will only focus on "quasi assets" that are indivisible from the company.

When evaluating the total intellectual capital of the company, care is to be taken to remove from the balance sheet the book value of assets included therein, in order to avoid multiple recording. The value of indivisible intellectual capital components purchased is normally included in the goodwill. (Divisible purchased intangible assets have been presented separately in Canadian and GAAP accounting reports since 2002, elsewhere they are added to the goodwill.) The majority of the value of produced intellectual capital is not included in reports at all, but certain parts thereof (successful developments, IT system) are often presented. According to the Hungarian accounting system, for instance, it is possible to report establishment and restructuring, experimental developments as well as produced and purchased intellectual products (inventions, patents, know-how, logos, software) (Art. 25 of Act C of 2000, 25).

The problems related to the valuation of intellectual capital components that can be owned and sold independently have been discussed in Section 2. In the next part, I will deal with the assessment of property that cannot sold and evaluated separately (soft intangibles), in compliance with the division applied by OECD (organisational structure and human resources).

We must not forget, however, that during the analysis of company operations, an infinite number of "value drivers" can be defined as they describe the effects of a phenomenon or event on value of the firm. Their optimum combination depends on the company in question; a factor that is primary at one business may be marginal for another enterprise. (Reszegi, 1998) In addition, the allocation of added value will differ depending on the factors covered.

3.2. QUASI ASSETS IN THE ORGANISATIONAL STRUCTURE

A number of intangible assets are connected to the organisational structure of a company, but the assessment of their value and expressing it as an exact figure is practically near impossible. In most cases, it is only their sudden loss that casts light on their importance.

Before summing up the related intellectual capital components, it is worth clarifying the concept of organisational structure. In this approach, the concept covers the quasi assets that are not linked to the knowledge or skills of the employees. Thus, information recorded in the system, documented company culture, the applied combination of resources and strategy may remain unchanged in theory even if the entire staff is replaced.

Although some definitions consider brand names and software parts of the organisational structure, these can be viewed as assets in the traditional sense, thus I will only include here the elements that cannot be transferred and are only valuable within the given organisation. The same definition is used by Shapiro and Balbirer (2000, p. 482), who state that the most important characteristic of these capital components is that they cannot be alienated.

This is why the goal of the valuation will not be the definition of the financial consideration, since that could not be realised anyhow, rather the mapping and tracing of quality and quantity, in an effort to support management decisions.

3.2.1. Strategy

In the modern view on corporate finance, the business maximises value if the combination of factors it applies cannot be changed in a manner that would cause secured cash flow and/or its net present value to increase. In this sense, **strategy marks the field of operation of the company and defines and limits the available and relevant combinations of factors.** Therefore, company strategy is a source of value in itself, that is, *the value of the company depends on its strategy*. Thus, a well-developed strategy that describes what production factor combination the company will use in the future can prove an inalienable but valuable asset.

Day (1990, pp. 336-341) believes that its value is identical with the value of future growth options, that is, the difference of value of the firm and the worth of current investments. At the same time, strategy described the way the company works, therefore the value allocated to

it by Day actually comes from the factors contributing to the operation, albeit it is created as a combination thereof.

This approach can be applied with difficulty also if an alternative strategy is also prepared for the case macroeconomic circumstances turn worse than expected, for instance. In this case, the second strategy would either be worthless or, if the value generated on its application is credited to it, then the total worth of strategies may exceed value of the firm. The fact that strategy is valuable is also underlined by the fact that the operating risk of the company is reduced if a second strategy is in place. It would thus be more practical to assess strategies on the basis of how much they increase the value of the company in comparison with the next best plan. (Who would pay more for a strategy than the growth in value realisable thereby?) This renders the individual assessment of strategies impossible, since the allocation of expected future added value depends on the number of versions prepared.

3.2.2. Company culture[20]

Ehrbar (2000, p. 214) claims that for a truly spectacular growth an appropriate measure of performance, a framework for analysis and an incentive system are not sufficient. The key element is the culture of excellence.

Black et al. (2001, p. 124) stress the importance of communicating value generation. By providing appropriate information to investors and giving a realistic company image, trust in the capital market will grow. This leads to a reduction of the perceived risk of the company and the more optimistic assessment of its prospects, which may lead to increased value.

It is not enough to record the principles of increasing value, Knight (1998, pp. 284-294) points out that they also need to be applied appropriately. Quality-focussed (Shapiro – Balbirer, 2000, pp. 483-484), and customer-oriented company culture may represent significant value, and as a result the name of the company can become associated with a higher level of customer satisfaction, and can become a logo of some sort. Measurement can be conducted by means of qualitative tools (detailed interviews, questionnaires).

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[20] The term "company culture" is used in valuation specialist literature to cover a very narrow area of the much wider concept of organisational culture, which also reflects a different approach (see for example: Bakacsi, 1999, pp. 226-251).

3.1.3. Risk management and safety systems

Reddin (1997) points out that generating value is also possible if the company reduces its risk, which is feasible by diversification within a given activity. (The other effects of diversification are detailed in the discussion of synergy.) He defines three types thereof: product, geographical and customer diversification. A fifth one could be added logically, namely supplier diversification. These do not primarily affect the volume of expected earnings but rather its stability, eliminating excessive dependence upon a certain market condition.

According to Shoniwa and Gilmore (1996), diversification also generates value in workforce management. They believe the risks connected to employees can be reduced if companies employ people with various talents in the appropriate distribution, especially in management. Not only does this improve intrinsic motivation and performance, but also enhances company creativity and adaptability.

The risk related to business operations can be also decreased by setting up suitable safety systems. These include labour safety, accident prevention, fire safety, environment protection, emergency and catastrophe handling as well as property protection programmes and insurances and the appropriate maintenance system, which all reduce the possibility of unexpected losses occurring or mitigate damage. Their value can be approximated by multiplying the volume of damage expected to be caused and the chance of occurrence. Afterwards, the present value of the expected costs is to be deducted from the calculated earnings. According to another approach, the value can be estimated by increasing the discounting rate used for the determination of value of the firm, and consider the difference between various rates as the point of reference. In this method, however, the appropriate correction of the discounting rate can hardly be defined, therefore modifications are largely arbitrary.

Srivastava et al. (1998) also draw attention to the fact that certain intellectual capital components generate value by decreasing the risk originating from the uncertainty of cash flow. Such may include risk management and forecasting systems, whose practical value is often only apparent in the fact that investors use a lower discounting rate for the assessment of forecast cash flow due to the lower company-specific risk.

3.2.4. Internal information system

According to the surveys conducted by Ernst & Young (1999, p. 157), a lot of companies are hindered by the lack of an appropriate internal information system. The value of a well-operating system can be grasped through internal flexibility options (Black et al., 1999, p. 196).

Effective decisions require suitable information, for which to be available, a well-planned management information system needs to be set up. Failure to do so will lead to inappropriate economic decisions. The value of such systems is measured through the improvement of decision-making effectiveness (the ability to look for and select alternatives), or in another approach, the loss caused by the lack of the system can be expressed as a figure by taking the worth of the loss caused in comparison with the best possible decision.

The value of internal electronic communication and administrative (IT) systems can be measured through the cost savings realised, but it is worth considering the work time freed up due to faster administration.

3.2.5. Business performance measurement

Various company performance measuring systems (for a detailed description of the systems see: Juhász, 2003a), such as residual earnings, EVA, MVA, CFROI, CVA and SHV may also improve value of the firm generation. The value of these systems should be measure in theory through the added value generated by their introduction, but application in itself does not represent a value, it casts light on the key elements of developments instead, and thus assists the making of suitable decisions.

The introduction of a performance measuring system related to value generation is considered by the market as a promising sign. The quotes of the shares of companies that declared they would introduce economic value addition (EVA) for instance grew by 30 percent in one week in early 1998, as shown in the survey conducted by the developer of the method, the Stern Stewart & Co.. (Ehrbar, 2000, p. 16).

Despite the wide range of available specialist literature, the application of the above assessment methods is far from common. According to a survey carried out in the United Kingdom but showing great similarity to international experiences (Arnold-Davies, 2000, pp. 151-162), the internal performance measuring of companies is mainly based on accounting.

The various systems developed from the 50s on to assess value generation are neglected, and the overwhelming majority of companies still uses solely accounting data when measuring performance. This contradiction is expected to lead in coming years to the wide-spread application of the above methods, in line with the spreading of information systems assisting value-generating management.

3.2.6. Existing business contacts, permits and contracts

The business relationships of the company and its existing contracts secure continuous operation. There would be no point in "copying" the assets of a company, the new business would remain inoperable until agreements are reached with business partners. These contacts cannot be acquired through the market.

Lynn (2000) points out that the relationship with a given business partner is often an interpersonal contact rather than loyalty to the company, therefore these are to be accounted in part as human resources. (This phenomenon is grasped partly by the problem of evaluating key persons of the firm which will be discussed later.) This is not only important to avoid multiple recording, but also because it adds the dimension of personal contacts to the value divided into general and company-specific knowledge represented by employees.

In connection with communal waste dumps, Mundy (1998) points out that the most important asset of these companies is definitely their operation permit, without which the worth of the abandoned quarries used for dumping waste is practically negligible. In essence, Blackman (1986, pp. 122-123) and Pollock (1998) refer to the same value when defining going concern value (GCV)[21]. Blacknam points out that according to a court ruling in the United States, goodwill represents the ability to produce verified added value (originating for instance from brand names and innovations), while going concern value (GCV) constitutes the *possibility* of generating value. (Pollock considers going concern value as a part of goodwill.)

When evaluating the goodwill that cannot be linked to individual assets, Brockington (1996, p. 130), who does not define added going concern value follows a similar concept. He believes that the goodwill produced by the company is to be calculated by evaluating all tangible and intangible assets of the company, regardless of their respective inclusion in the

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[21] Blackman classifies this item as an intangible asset, so it is not identical with the value of the company defined according to the expected income-generating capacity on a going concern basis.

balance sheet, and then multiply the result with the profit expected on the basis of operating risk. This amount is then deducted from the standard earnings of the company, and the remaining extra profit (or loss) is capitalised with the expected profit rate. In this concept, the added value generated by the company in the future (total added economic value, thus theoretically the added market value) is included in the twice corrected[22] balance sheet as an asset. The inclusion of this item secures that the total worth of assets is equal to the value of the company computed on the basis of forecast income-generating capacity.

In their presentation of the opinion of Appraisal Institute, Wolverton et al. (2002) firmly object to the application of going concern value. They claim the name is misleading, and it should rather refer to the total market value of an operating company. On the other hand, they accept capitalised economic profit (CEP) as an asset, which they calculate in a manner practically identical with that proposed by Brockington. (Thus, their suggestion is aimed at the correction of the name rather than the concept itself.)

Relationships that are crucial from an economic viewpoint are usually discussed by specialist literature in three different approaches. The relationship with customers is normally of utmost significance, while in certain segments the relationship with external parties is of primary importance. The former can be measured in an absolute manner, the assessment of favourable contracts, however, where the relative deviation from current market conditions is to be evaluated, poses specific problems. In the next part, I will discuss these in more detail.

3.2.6.1. Customer relationships

The relationship with customers is of cardinal importance with respect to the sales the company. Sargeant (2001) stresses that the approach to customers assumed in marketing has changed significantly in recent years, with emphasis shifting to the long-term returns on the relationship already established. Thus, particular contacts can once more be described through the long term investment-returns approach covering the entire range of products and services rather than the short-term income-cost assessment focussing on a single product. (This approach is also the basis of customer relationship management – CRM.)

In this approach, the customer acquisition costs are to be capitalised and should be amortised on the basis of the expected term of the relationship. The lifetime indicator (LTV) proposed by Sargeant, however, which in practice represents the discounted present value of

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[22] The fist correction is necessary to define the fair value of the asset.

the incomes and expenses related to the customer relationship in question, can hardly be used for the valuation of the customer base, since not only does it ignore the expenses of invested capital, but it does not allow for any intellectual capital components other than customer relationships, either. In addition, customer base seems to be more cheaply replaceable at all times in this model than its accounted value, since companies will only enter contacts with an expectably positive NPV.

There are two possible ways of evaluating contacts: the basis is either to be the historical acquisition cost or replacement cost under the current circumstances. Due to continuous market changes, most authors suggest the latter method. Sargeant (2001) suggests that the more detailed analysis of customer relationships can help make more accurate estimations, since the buying habits of various groups and the expected lifetime of the relationship can vary significantly. The analysis of relationships is also emphasised by the supporters of measuring intellectual capital along the lines of the ScoreCard system, who most often refer to the assessment of the relationship with the affected parties when pointing out the shortcomings of valuation in terms of money.

On the other hand, we must not forget that sales contracts that are *declared* to be long term, often made for a definite period and in some cases pre-paid, may make the planning of company operations significantly easier, thus reducing the underlying risk. Their value is therefore definitely higher than that of *expectably* long-term relationships. These assets play a crucial role in the valuation of papers, cable TV companies, mobile phone and Internet service providers. (If the agreements can be transferred, their value is to be included among actual assets.)

3.2.6.2. Other contacts and reputation

In numerous industry segments, the relationship with various external groups has crucial importance in the process of generating value. The most common examples include: developed sales network (commerce); supplier systems, clusters (suppliers); trade union contacts, employee loyalty programmes, workplace atmosphere (employees); research and cooperation agreements (strategic partners, competitors); direct effect on law-making, lobby power (government); environment protection (natural environment); as well as sponsorships and protectorates (NGOs). The importance of these items vary significantly by country, geographical area, industry segment and also with time.

If a company has contacts that are indispensable for pursuing activities in the given industry segment (operation permits, government relationships in certain countries, and appearance as an ethical and responsible organisation in others are some examples), these are to be taken into consideration at least on their replacement cost, since the company cannot operate without them. These can be accounted as separated assets.

In certain sectors, the aforementioned contacts are not vital but may still bring some advantage. This can manifest in a larger sales volume, faster and more flexible administration or more favourable credit conditions. If these items can be expressed as a figure, their value should be estimated on the basis of the present value of the earnings related to them. In this case, the replacement cost should only be applied as an upper limit, since it is possible that the expected profits are below the costs related to the establishment of the relationship.

The good reputation, popularity recognition of the company (and its brands) can have several advantages. Their values can be expressed in terms of numbers through the relevant changes in future cash flow. The effects are summed on Table 12, grouped by orientation.

Possible positive effects of company recognition and reputation on certain relationships

Party	Advantages
Investors	Lower price volatility, higher price
Employees, managers	Lower recruitment costs, lower wages and costs related to keeping employees (organisational identification, motivation, satisfaction)
Creditors	Lower interests, better credit conditions
Suppliers	Lower prices, longer payment deadlines
Distribution network	Lower fees, priority handling, wider distribution area, more flexible relationship
Customers	Premium price, more frequent purchases, larger volume (more trust, easier product identification)
Competitors	Increasing entry barrier, comparative advantage and cooperation willingness

Based on Haigh (2001) and Maathuis (1999, p. 26)

Table 12

Spekman, Isabella and MacAvoy (2000, pp. 28-37) emphasise the importance of the value generated by company cooperations and alliances. Cooperations mean lower costs, access to new markets, natural resources, technologies and know-how, that is, may result in competitive advantage in some way. Their value can be estimated depending on the relevant type, mainly using the replacement and reproduction values as the points of reference. The expression of savings as an exact amount and revealing the possible application of new resources may make

the use of earnings-based methods (DCF, capitalisation, real options) necessary. The authors believe that the ideal tool for the valuation of the profits from cooperations is the Balanced Scorecard, since these may add a number of intangible asset components to the company (pp. 234-240). Accordingly, the first step should be the identification of the effect of particular cooperations on various fields in order that they can be assessed.

Agreements that prevent the former owner from re-entering the market for a set amount of time can also be included here (Blackman, 1986, pp. 126). Thus, the company is actually improving its competitive situation, although this clause will only be really valuable if the entrance of the former owner would have a significant effect on market conditions.

3.2.6.3. Favourable contracts

Certain contracts secure a sale profit margin in excess of the normal level or may specify procurement prices that are below market prices. The value thus generated can be approximated through the present value of the extra profit realised in comparison with procurement at the regular price level (cost savings). In the course of the correction, the present value of the losses deriving from contracts that are unfavourable to the company is also to be taken into account.

3.2.7. Plan records and archives

Companies usually have file rooms and archives. Some of these can be sold separately, their reproduction value is included in the balance sheet. Such are the music collections of records companies, map archives or geological survey results that are also useful to other market players in the industry in question.

According to the Hungarian accounting rules, such files are included among tangible assets in the balance sheet, but the regulation stresses that no planned depreciation can be accounted with respect to these assets (pieces of art, archaeological finds, archives and collections) since their value grows with time (Art. 52 of Act C of 2000).

Other types of collections, file and plan archives and documents are only useful for the company in question, and they may as well be indispensable for everyday activities. Contracts

made with business partners, permit issued to the company, litigation documents and the layout of the buildings constructed or owned by the company are vital elements to the smooth operation of as company (going concern value), thus their replacement cost is definitely to be accounted in the case of their loss.

Certain documents are related to particular assets (machine handbooks, logos, emblems, detailed description of patents), their worth is included in the value of the given asset. If they do not exist, the value of the asset is to be reduced by the replacement cost.

3.2.8. Industry- and country-specific characteristics

Srivastava et al. (1998) consider industrial entry barriers as the quasi assets of the company. This approach gives a new meaning to the concept of competitive advantage. Since if a favourable situation is only enjoyed by the company in question in the entire market, then it has a competitive advantage. If all market players have the same advantage but others do not, then new entrants will have to face an entry barrier (Porter, 1993).

While various competitive advantages can be grasped in the individual discounting rate applied with respect to the company as well as in the higher cash flow and better growth prospects (due to the lower company-specific risk), entry barriers reduce the risks of every company in the given industry sector, thus industrial risk and the profit expected are reduced.

If we accept the above argumentation, country-specific advantages (market size, infrastructure, language barriers) are also to be considered as company quasi assets, since these affect both growth options and business risk.

This approach leads very far, since the discounting rates or multipliers specified on its basis with the application of certain premiums in the course of valuation across borders actually mean that the quasi assets of the company in question are in part accounted for, and are thus fully acceptable. (In contrast with the view that only discounting rates based on data from the local capital market are acceptable.)

In Section 3.1., the first group of intellectual capital components, namely those related to the organisational structure have been revised. In addition to strategy that defines the method of generating value, company culture affects internal operations and daily business while information and performance measuring systems mainly assist internal company processes. Out of the components that can have value even outside the scope of the given company, the

most important are various business contacts, plan records and archives as well as the characteristics concerning the industry segment and the operating environment.

The above mainly represent external factors or can be transformed by the company at any time, and thus their underlying risk can be forecast more accurately than that of the quasi assets discussed in Section 3.2., which are related to human resources, and whose modification is only possible if the requirements and goals of the affected employees are also taken into consideration.

3.3. HUMAN RESOURCES

In addition to the effects related to the organisational structure, the other large group of intellectual capital components is made up by the factors linked to human resources. While many managers emphasise that the most valuable "assets" of the company are its employees, it is rarely actually measured.

Nobody questions that employees play an important role in the creation of value of the firm. In their examination of the capital market of the United States, Abowd et al. (1989) found that price volatility increases after publishing statements concerning human resources, i.e. investors do not only focus on the items directly linked to the payroll but also news on relocations, restructuring and promotions[23].

Boon (1999, p. 271) assessed Dutch manufacturer companies and showed that the effect of their training expenses between 1990 and 1993 on added value was significant, and proportionately neared that of R&D expenses.

Brealey and Myers (1999, Vol. II, pp. 348) share a similar opinion when claiming that "the value of the majority of enterprises depends on the worth of human resources." On the other hand – reminding of the example of the Portuguese bank BCP – they warn against investors paying a too high price for people who are likely to leave the company. (The employees of the investment fund manager company purchased by the bank were against the acquisition and collectively left the company after the conclusion of the transaction.)

Standfield (2002, pp. 124-125) believes that apart from the earnings generated by investments (that presumably do not require workforce and financial investments), some profit is to be allocated to human resources and it is to be evaluated on this bases. It is hard, however, to accept this as a starting point, since he would credit the profit from previous investments to current employees, and assets like brand names and the machinery used in research would appear as worthless.

Barker (2001, p. 111) and Pène (1979, p. 258) do not share the view presented by Standfield. They believe employees cannot be considered as company assets, since they are not at the unlimited disposal of the company, and they (workers) can at any time – with some restrictions in place – leave the company. Therefore, Barker argues, it is better to consider people as the "primary source of goodwill". In practice, however, this means nothing but refining the question, since then we have to find the answer to what extra (goodwill) will a

customer be willing to pay because the company employs the staff members in question. Fernández (2002, p. 584) supposes that value should be defined on the basis of the wages paid to employees.

3.3.1. Valuation models for human resources

Human capital was first mentioned in specialist literature concerning valuation in the 1950s (Personnel Today, 2002), while the possible ways of accounting human resources (Human Resource Accounting - HRA) were first discussed in the 1960s. (Barcons-Vilardell – Moya-Gutierrez, 1999; Johanson, 1999). In criticism of the theories based on the principle of profitability, several authors suggested in the 1970s that the time of slavery was over[24], companies did not own their employees, thus they cannot be considered as assets, and must be excluded from the balance sheet, their accountancy-based handling was a mistaken and pointless goal to start with.

The role people played in generating value, however, constantly grew, and so the problem became increasingly difficult to ignore. In the late 1970s, Neuman and Segev (1978) propose that a new form of insurance be introduced, having recognised that human resources have numerous underlying risks for companies, albeit no insurance product is offered to them except for the life and accident insurance policies for key persons.

Swann (1978) stresses that unlike machines, the maximum capacity of human resources cannot be measured, which makes it very difficult to measure employee and manager performances. (This problem is illustrated by the restraining of performance practised by piece-rate workers.) Therefore, the measurement of the extent of utilisation and the identification of improvement opportunities is rather difficult.

Sutherland (1985, p. 56) recommends that unnecessary redundancies, all compensation offered by the company, the quality of existing working relationship, the ratio of trade union members and workforce environment are also to be taken into account when considering the value represented by the employees.

By the 1990s, the value of knowledge had continued to rise. This is well illustrated by the fact that the Swedish government proposed to accept a degree in 1991 that was to make it

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[23] The survey (Abowd et al., 1989) considered all statements made between 1980 and 1987 (a total of 452 and 195 related to human resources).

[24] In the southern areas of the United States, in the time of slavery, slaves were included in the balance sheet as assets, at a monetary value defined on the basis of their skills, health and age! (Kovács-Lévai, 2000)

mandatory for companies with a staff headcount of over 100 to detail the changes to their human resources (fluctuation, sick leaves, training, work conditions) in their annual report (Johanson, 1999). Although this proposal was later withdrawn, its reality is shown by the findings of a survey conducted in 1994, which showed that 70 percent of Stockholm-based companies with a headcount of over 200 persons used some sort of a human resources accounting (HRA) system.

By the mid-90s, attention had gradually shifted to psychological factors. Bouillon and Doran (1995) examined 260 companies in the United States and showed that lower fluctuation and more experience at the company demanded from the general manager both improved company returns. Reichheld and Teal (1996) developed their already discussed theory at practically the same time, which considers loyalty as the ultimate source of generating value.

In his assessment of the difficulties related to the application of the Scandinavian systems through case studies, Johanson (1999) claimed that these methods are far from perfect. Their most significant shortcoming is that they cannot take into account the emotional factor and the differences between people. Social order, power and situation-specific factors are also ignored. As a conclusion, he questions that a coherent model can be set up for a phenomenon as complex as structural changes.

Lynn (2000) points out that in addition to the specialist and general knowledge of the employees, a valuation of human resources should also consider the personal relationships relevant to business activities (customer, supplier, authority and strategic partner contacts). This can be a particularly significant element in the case of service providers (consultants, journalists, doctors and hairdressers).

The survey of the American Society for Training and Development (ASTD) carried out in 2000 is cited by Oliver (2001). This shows that out of the over 500 United States-based companies asked, those spending more on employee training than the average secured profits 46 percent above market average and 86 percent more than those who spent less on employee training than the market average. According to the findings of another survey, 84 percent of companies believe the significance of human resources has increased in recent years, and they expect the trend to grow stronger. 47 percent of companies answered that the greatest challenge in our days is finding and keeping the appropriate employees (Oliver, 2001).

3.3.1.1. Ethical concerns

Several authors claim that the measurement of the value of human resources leads to ethical problems. Ebersberger (1981), for instance, believes that the numerical valuation of human resources can have severe psychological indications. She suggested that a sort of programmed society could develop, in which individuals are cattle-branded with their value, which in addition is amortised with time, so that the appearance is that persons grow less valuable.

A positive or negative valuation could prove a self-fulfilling prophecy and fundamentally determine the performance, future and career of the individual. Having considered this, even a minor measurement or estimation error can have tremendous consequences. She believes that the only advantages of human resources accounting (HRA) are that the amounts spent on training can be legitimised, and that a common terminology is set up for human resources management and finance. The potential negative effect on the self-esteem of the employees can cause damage exceeding the above profits by far.

In her criticism, Ebersberger (1981) notes that the utilisation of human resources accounting systems as an asset supporting decision-making is jeopardised by three sources of risk: managers, employees and the process itself. Managers may use human resources accounting to manipulate employees: they might reduce employee value as a sort of punishment, or may transfer staff members at the end of the year so that indicators appear more favourable. Employees (and trade unions) may start demanding to be paid on the basis of the value of their knowledge, which could lead to grave disorder at universities, for example. The bargaining power of the employee is fundamentally changed if the value they generate for the company can be identified. Thus, the result of the measurement process has direct feedback on the value itself.

3.3.1.2. The purpose of valuation

Having considered the above, it is important to underline that in the course of evaluating human resources, it is not the employee being assessed, which would make no sense to start with, since it is hardly feasible to express life in terms of money. Thus, I define the purpose of evaluating human resources as follows:

The purpose of evaluating human resources is to define the value generated by the company by utilising the workforce and/or work time purchased from its current employees in the given way.

Assessing people would suggest that the only way of generating value is the changing of the skills or personality of the employee, or replacing them with another staff member. On the other hand, the above approach indicates that (1) we are interested in the value generated from the viewpoint of the company, (2) only the acquired workforce (or time) is assessed, not the person themselves, (3) the main characteristic of value is the way of utilisation, which depends primarily on the company (and its management), not the employee. Also, the definition shows that (4) only the skills and knowledge of the employee that are actually (and effectively) utilised for the attainment of the goals of the company are evaluated.

Therefore, any employee can have multiple values as the member of various companies, departments or work teams. In many cases, the measurement of value at the level of the individual may prove problematic, since in most organisations, tasks are assigned to teams, since the experience, knowledge, time and skills of a single person are not sufficient for the appropriate performance of diverse tasks. The comparison of different types of contribution (organisation, management, planning, contacts, implementation) is practically impossible.

By definition, therefore, value can be generated not only by the suitable selection and training of employees but also their motivation, leadership and the appropriate and effective organisation of work, too. The significance of this fact is illustrated by the findings of a survey carried out in the United States, in which company managers estimated that a mere 20 percent of the knowledge gathered in an organisation is actually used (Stewart, 1994).

The above should lead us to reject Ebersberger's idea (1981) that the goal of the human resources accounting system is the more realistic presentation of the assets of undervalued companies, whose "by-product" is that the amount spent on employee training are also justified. This concept presumes some sort of a naïve approach based on book value on the part of the investors, which is not realistic, especially taking into account the increasing difference between book value and market value.

The primary objectives are much more to support the generation of value and to describe the effect of human resource-linked decisions on the value of the firm from a financial viewpoint. Investors examine labour contracts when applying the discounted cash flow (DCF) method, anyway. With respect to managers, individual agreements, as for the employees, the Labour Code, the trade union collective agreement or the company agreement should be

governing. These need to be revised, which also supports the explicit handling of human resources.

3.3.1.3. Valuation methods

The methods developed for the financial valuation of human resources belong to one of five major systems of valuation theory. In addition to the methods based on historical cost, replacement and opportunity costs, several authors suggest taking the market price of workforce or the earnings generated by employees as the starting point.

Historical cost. Barcons-Vilardell and Moya-Gutierrez (1999) believe that the costs related to human resources can be divided into two groups. (1) The expenses of acquiring workforce cover the costs related to recruiting, selection, contracting and the integration of the employee in the organisation. These only occur once for each employee. There are repetitive items, however, including (2) training costs, which include coaching, orientation, promotion, transfer and development.

In specialist literature, some authors suggest that these be accounted at their historical price, while others believe that current prices should be the starting pint. The former is, however, subject to wide criticism. In her discussion of the problems related to cist-based valuation with changing market conditions and prices, Ebersberger (1981) defines five specialities. (1) The skills of people participating in the same training can vary depending on the quality of education, (2) the ability to utilise the same training in practice may vary by person, (3) employees may create innovations and patents that each far beyond cost-based value, (4) some trainings may have a detrimental effect on work ability, and (5) employees may learn things they do not need for their job. In addition to the above, Barcons-Vilardell and Moya-Gutierrez (1999) point out that the costs of in-house training, the continuous communication of knowledge and coaching can hardly be estimated.

Replacement cost. This method is fundamentally identical with referring to cost price at current price levels, but it is a significant difference that it does not only include the costs incurring in connection with the employment and coaching of the new staff member, but also the expenses originating from the dismissal of the former worker. (How much would it cost to fill a position *again*?)

Dismissal costs are divided into three groups by Barcons-Vilardell and Moya-Gutierrez (1999)[25]: loss caused by decreasing effectiveness before the dismissal, loss due to unfilled position and dismissal wages. In connection with the handling of dismissal wages, remunerations and premiums, they bring up the question whether such expenses could be capitalised as parts of human resources costs in a human resources accounting (HRA) system. They reject this idea, and claim that this cost is linked to an "asset" that has lost value due to the very same cost. (They would thus not capitalise the costs of liquidating this asset.) Another argument against the above proposal is that this way higher fluctuation (higher dismissal costs) would seem to generate more value. If the premiums paid on leaving the company serve to enhance employees' loyalty (by not being due if the employee leaves the company of their own accord, for instance), then they should be capitalised (preferable beforehand) and then become subject to amortisation.

Ebersberger (1981) mentions among the shortcomings of the replacement cost method that this concept also fails to account for the loyalty of employees to the company and their ability to work in a team, and also ignores the effect of wages being below the regular level.

Opportunity cost. Opportunity costs represents the highest price of the given employee under different circumstances. Market price would hardly be suitable for the estimation of opportunity cost, however, since due to the substantial difference between the bargaining powers of the employer and the employee, the difference between the value and the price of the workforce is also large. Several authors[26] suggest that an intra-company labour market should be set up in an effort to define the value, where human resources would be competed for in the same returns-based manner as in many cases for the capital required for investments.

Market-based methods. In certain industries, labour market is highly efficient, since employees represent special and unique resources (thus they can hardly or not at all be replaced), therefore the bargaining powers of the employee and the employer are nearly equal. The top players in certain sports as well as film stars and, according to some, top managers are remunerated on the basis of opportunity costs due to their limited availability, thus market price can give a good estimate of the generated value.

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[25] Based on: Ripoll, V. – Labatut, G. (1994): La contabilidad de gestión y los costes de recursos humanos: implicaciones contables y fiscals de su activatión, Técnica Contable, January 1994.

[26] For example: Hekimian, James S. – Jones, Curtis H. (1967): Put people on your balance sheet, Harvard Business Review, January-February 1967, pp. 107-113.

This method can, however, be used only in a narrow range. Competition for particular employees is only present in a few sports that are extremely popular in the given area, and the method could only be used with respect to very few film actors and actresses.

Earnings-based methods. In connection with the application of method based on the definition of the present value of the profits that can be allocated to workforce, Sutherland (1985, p. 57-58) suggests that – especially in the cases of family ownership – there is a trade-off between manager remuneration and shareholder earnings. Thus, it is not only the forecasting of future personal costs that poses a problem but also that of expected income of the owners.

Neumann and Segev (1978), as well as Pène (1979) (for details on his model see Section 3.2.1.3.) believe hat the earnings (profit) generated by the company using its human resources would be approximated by future wages. Neumann and Segev mention immediately that this value based on forecasts could hardly be incorporated into accounting, and they recognise that the replacement of cheaper workforce with a more expensive alterative would not appear as loss at the company.

It is also to be added that approximation with wages would only be acceptable if employees and companies had the same negotiating power, and defined salaries jointly by means of negotiations. Cash flow connected indubitably to human resources could only be realised if the company managed to keep the employee permanently for a wage below market prices. This can be interpreted as a contract made with the employee that is favourable to the company, and should be handled in the usual manner with respect to procurements below the regular price.

Value approximations based on wages are founded on the argument that no one would pay more for something than what it is worth to them. This means that the profit generated by the human resources in a certain period of time is at least equal to the wages paid.

Ehrbar (2000, p. 31) points out that "the most valuable asset of any company is the creativity and strife for success that exists in everybody and is normally much more significant than what they are credited for." This point reminds us that accounting only records financial compensation. However, numerous organisational behaviour models (Bakacsi, 1999, pp. 81-99) show that this is not the only objective of employees in their work, so they obviously also appreciate receiving other forms of compensation (career, power, reputation, the possibility of self-realisation).

Giles and Robinson (see their model in Section 3.2.1.3.) go further than the discounted wages referred to by Neumann, Segev and Pène: they defined multipliers that show the ratio of the annual wage and the value represented by the employee to the company.

Whichever valuation method we choose to apply from the above, the capitalised value is to be reduced gradually, since – as emphasised by Swann (1978) – the only certain thing is that all employees will leave the organisation at a certain point in time and the value accounted with respect to them should be nil afterwards.

Some claim that once the expected duration of the employment is estimated, simple linear depreciation should be used. Others believe this is only applicable to basic knowledge, and suggest that various parts of knowledge (familiarity with technology, professional knowledge, company tacit knowledge) become obsolete at different rates, thus the value of various knowledge components should be recorded separately and amortised along a unique scheme. According to Ebersberger (1981), even this is not sufficient: he claims individuals may differ so much that the "wearing off" of their knowledge cannot be grasped by applying universal amortisation rates, but should rather be defined individually.

This proposal is inlay feasible in practice if value is to be measured at the level of the individual. If reports prepared at the level of groups that are nearly homogenous regarding value are sufficient, applying an average amortisation rate for the total can lead to the appropriate result.

The problem of defining the suitable amortisation rate is practically the same as what we see with respect to tangible assets. Actually, it would be much better for companies to revaluate their human resources on a regular basis, at least annually, rather than applying continuous amortisation in the books, and the defined difference in the value should be included instead of the previously calculated depreciation.

Considering the difficulty of the development and application of systems that measure in terms of money, it is hardly surprising that many authors have attempted to separate valuation objectives. There are several examples of non-financial (ScoreCard type) measurements that abandon the objective of evaluating property financially and focus primarily on recording, tracing and managing. The *human capital index* (HCI) of Watson Wyatt consultancy to reflect the human resources management practices of the company is in opinion of the developer closely connected to the profitability and market value of the given company (Gochman – Luss, 2002).

The consultancy defined five factors that have the most significant effect on value of the firm: the (1) wage and remuneration system, the (2) establishment of a collegial and flexible workplace, the (3) recruitment and keeping of employees, the (4) communication integrity and the (5) application of suitable HR techniques. On the other hand, the inappropriate utilisation of resources may result in severe value loss, up to 14.5 – 33.9 percent (Gochman – Luss, 2002). The importance of particular factors can differ even according to the measurements made by the developer. The potential extent of effect on value of the firm is shown in Table 13.

Significance of HR factors increasing value of the firm

Factor	Increase in realisable value
Appropriate benefit system	16.5 – 21.5 percent
Collegial, flexible workplace	9.0 – 21.5 percent
Appropriate recruitment and keeping	5.4 – 14.6 percent
Communication integrity	2.6 – 7.1 percent
Effective HR techniques	4.2 – 6.5 percent

Source: www.watsonwyatt.com (11 March 2003)
Table 13

This system that evaluates companies on a scale from 0 to 100 is criticised mostly because many believe that a company is able to invest more in the development of its human resources because of its better profitability, thus the relationship is the opposite of what the developers suggest. (Gochman and Luss attempted to contradict this by quoting a single correlation ratio that is difficult to verify.)

The human capital index can be defined most accurately as a specialised ScoreCard system. Following the example of Watson Wyatt, several major consulting businesses have set up similar systems, usually within the framework of a complex intellectual capital measurement system (Lewis, 2002).

3.3.1.4. Valuation models for human resources

Numerous models have been developed to assist the complex valuation of human resources at a company level. In connection with these models, it is often asked whether it is worth assessing employees and managers separately. Most human resources valuation models apply joint assessment, but several attempts have been made at the independent valuation of

the management. Accordingly, in the next part I will discuss the comprehensive theories, and deal with the special issued of manager valuation in a separate section.

Evaluation models are constructed on largely different bases. **Becker** (1962)[27] (quoted by Bouillon and Doran, 1995) refers to the marginal profit principle in his model to explain the value of human resources. No employee receives a wage in excess of the marginal product of his/her work, which is defined by the composition of their qualifications (and the capacities of the employer). The market enforces that the increase in the productivity that could be utilised by other companies, too, is paid fully to the employee, while in the case of company-specific training, the employer is to optimise its activities in a manner that it will not be worth for the employee to leave the company until the extra productivity has covered training costs.

The scope of the model can be extended to more than one periods. In this case, Doeringer and Piore (1971)[28] (quoted by Bouillon-Doran, 1995) believe that companies set up a promotion scheme that reflects the amount of company-specific knowledge. On this basis, they suggest that the number of the levels of internal hierarchy should be used as an approximation of the investments made in human resources and the returns thereon.

On the basis of this model, Bouillon and Doran (1995) examined the company returns on education investments, and found that market prices reflect the worth of these investments as measured in line with the above. Their findings suggest that low fluctuation and internal hierarchy both increased company profits. (The length of the internal company hierarchy was measured by the years the general managers spent at the company before their appointment.) They also showed that − in accordance with the theory − the average ten-year returns of companies with low fluctuation but general managers of little company experience remained significantly below the average.

Likert (1967, p. 115) believes that the capital invested in human resources is much easier to account for than to evaluate other types of investment. (1) The first possibility collects the start-up costs of the company. All expenses incurring in connection with the recruitment of people and their transformation into an operating organisation. (2) The second solution is to assess what costs would incur if the positions at the company were to be filled today: how much finding, selecting and training the appropriate person would cost. This method,

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[27] Becker, G. S. (1962): Investment in human capital: A theoretical analysis, The Journal of Political Economy, October 1962, pp. 9-49.

[28] Doeringer, P. – Piore, M. (1971): Internal labor markets and manpower analysis, Heath

however, fails to account for the costs linked to setting up the appropriate organisational structure, which it defines as synergistic components. The other disadvantage is the huge expense related to collecting data, which Likert suggests could be reduced by sampling.

The author proposes both methods as estimations, since the actual worth is the present value of the income generated by human resources, but its definition would prove very difficult and rather inaccurate. He points out, however, that even if recording in accounting cannot be implemented overnight, the more accurate understanding of company processes would be greatly enhanced if the reports linked to workforce valuation were included at least in the Appendixs to statements.

In their model published in 1972[29], **Giles and Robinson** (quoted by Swann, 1978) claim that all applied values are to be defined by using a multiple. (Table 14). The multiple shows how many fold his/her annual salary the given employee is worth for the company.

The multipliers of Giles and Robinson

Top managers	above 2.5
Mid-level managers	1.5-3.0
Operative management	1.0-2.0
Employees	0-1.5

Based on Swann (1978)
Table 14

This concept brings up a number of difficulties. In this model, the value of the company could be increased by raising wages or recruiting new employees, while the reduction of organisational hierarchy would have a detrimental effect on value.

If we accept that there is an exact value of human capital, there is always a multiplier that describes the relationship between wages and value accurately (either at personal or at organisational level), but it is unclear how to define this ratio, and the rates specified by the authors seem rather ad hoc.

It is also questionable whether labour market really forms wage ratios in compliance with the ability to generate value. While there are numerous examples to show that wage levels in successful industries are higher, one can often encounter cases when it is not only the capacity to generate value that plays a significant role. Trade unions that are especially powerful may force wages in the industry up, while if there is only a single customer on the market for a

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[29] Giles, W. J. – Robinson, D. (1972): Human asset accounting, IPM – ICMA, London

particular task (monopoly) (see air and railway transport, post and the defence industry), he employee cannot effectively use leaving the company as a realistic threat, thus wages tend to be lower. In this case, however, there is little point in applying the above rates across several industries.

Pène (1979, pp. 259-262) outlines several valuation approaches. (1) It is possible to capitalise and gradually depreciate all expenses related to workforce acquisition. (2) It is theoretically possible to define replacement cost, but this would require not only expressing the costs of finding, recruiting, coaching and possibly dismissing employees in terms of numbers but also, a decision is to be made concerning what is to be done for instance with the restructuring costs incurring in connection with the replacement of the employee or such indirect costs of the recruitment as the work time of other employees, the operational malfunctions of the organisation and decreasing effectiveness before leaving the company.

In connection with the above problem, Stewart (1991, p. 34) suggests that all learning aids and books that have an effect on the performance of their readers relevant to the company should be considered as investments rather than expenses. Madden (1999, p. 231) proposes that following the examples of R&D and (brand building) advertising costs, companies should capitalise and amortise the training expenses of employees.

Pène (1979, p. 259) warns, however, that such capitalisation and depreciation of expenses related to the development of human resources cannot have any tax implications or legal consequences, since the "assets" thus capitalised are not owned by the company. Then, however, the point in capitalisation is questioned. This approach cannot be used in itself partly because the existing expert knowledge of employees recruited already trained would be excluded from the valuation.

(3) According to a third approach, the worth of the workforce is given by the value it will produce in the future. Pène proposes two methods for the estimation thereof: the value can be approximated through wages or the fee payable to an external business in the case of outsourcing. The latter may prove difficult not only because of the lack of offers, but also because certain activities cannot be outsourced.[30]

Approximation through expected wages is to be rejected for several reasons. These give the lowest estimate of the generated value − as we have seen above − and some company advantages could not be assessed using this approach. Copeland et al. (1999, p. 198) point

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[30] For instance, only an employee of the company can act on behalf thereof, thus if a position involves the instruction or supervision of employees, this cannot be outsourced to an other firm.

out, for example, that companies without trade unions normally operate with lower wage costs. If an earnings-based valuation is carried out, its effect will of course appear in the cash flow forecasts and thus in the value of the firm, but asset-based estimates are to be corrected appropriately. They recommend the use of the present value of costs savings.

In addition, if the wages payable in the future are used for the estimation of generated value, practically all money spent on human resources in excess of the wage represent loss, thus the final estimate would in all cases be negative. The management of potential overemployment also needs to be solved. Unused workforce is unlikely to generate actual value.

If the "asset value" of employees could be estimated, the costs related thereto would have to be considered as liabilities (Pène, 1979, pp. 260-261). Wages, benefits and taxes payable in the future would thus appear as liabilities.

Turner and Jackson-Cox (2002) suggest that the knowledge of employees should be evaluated in two parts. In practice, they improve Becker's model and propose the separate valuation of general and tacit (company-related) knowledge.

General knowledge covers the basics, tertiary studies and coaching. Their respective values are defined as the present value of the costs incurring on acquisition, in the form of an annuity:

$$K = c * \frac{(1 + r)^n - 1}{r}$$

where K is the value of knowledge, c the annual standard cost, r the long-term return rate and n the number of years spent with training.

Their recommendation is to define costs on the basis of current market conditions, since the former costs of lengthy training are usually not in any way related to the present situation. This is practically identical with the replacement cost concept.

The authors claim that the value of basic knowledge thus defined is for life, so it needs to be amortised theoretically on the basis of the entire period of time the employee spend working. If the employee should leave the company prematurely, the difference is to be accounted as loss.

With respect to higher specialist knowledge, value is reduced not only as the remaining time for application useful for the company passes, but also with specialist information

becoming obsolete. Accordingly, the authors believe acquired knowledge should be depreciated considering the expected time before it becomes obsolete.

Company-specific knowledge is discussed through the value of the working hours during which employees exchange knowledge. They propose to estimate the time thus spent and multiply it with the attributable average wage at the company and the time that can be spent at the company until retirement. The total knowledge value thus computed could be acquired in their model during an entire lifetime, therefore they suggest that it should be capitalised continuously, proportionately to the number of years passed, along an S-curve describing the characteristics of acquiring knowledge. (See Chart 6.) Then, the value of the total knowledge base of the company is calculated by simply adding up the values of individual knowledge.

The cumulative value of tacit knowledge in the model of Turner and Jackson-Cox
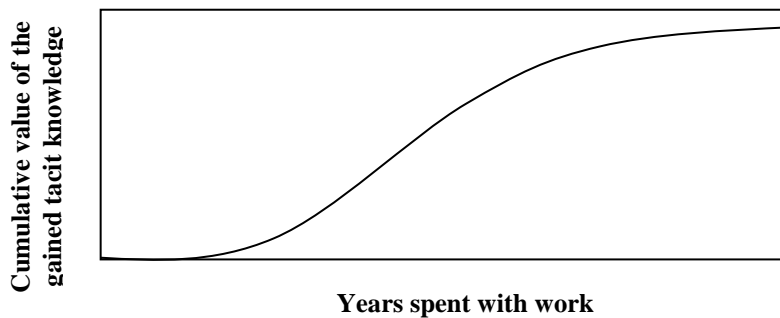
Source: Turner and Jackson-Cox (2002)
Chart 6

This very simplified model relies on very strong assumptions. (For example, it assumes that the intensity of exchanging knowledge is identical in all types of communication.) When describing general knowledge, it would be practical to only capitalise the knowledge vale attributable to the expected duration of the employment (estimated on the basis of average mobility, for example), thus non-recurring depreciation and the continuous overestimation of knowledge value could be avoided.

Even more serious reservations are appropriate concerning the estimation of the value of tacit knowledge. Measuring the time spent with exchanging knowledge can prove rather difficult, since it is unclear what exactly is defined as knowledge exchange. Also, this would necessarily involve more than one employees at the same time. Since the communicator of knowledge does not acquire any new information, the procedure used in the model needs to be corrected. This can most easily be done by deducting the average wage of the employee computed for the entire duration of a knowledge exchange from the value thereof.

3.3.1.5. Human added value model

Although much the above approaches differ, they can all be fitted in a single frame. In the next part, I will outline an added-value model on the basis of the above models and their criticism.

First, terminology needs to be clarified. In the specialist literature concerning the valuation of human resources, human capital and human asset are commonly used as synonyms, albeit they represent two different approaches from an accounting viewpoint.

The costs related to human resources as per accounting rules are to be deducted immediately from the annual earnings, capitalisation is not an option. On the other hand, it is generally accepted that expenses (costs) connected to the workforce generate assets (knowledge, organisation and contacts) that serve the goals of the company on a long term. This means that a sort of "human asset" needs to be introduced in the balance sheet. The modification of the accounting system cannot be the goal, however, since its purpose is not to show the fair value of the firm.

The correction made to valuation in an effort to "turn current expenses into assets" is far from being unprecedented. In the case of leased productive assets, for instance, it is very common to present the current cost "capitalised" in order to give a picture on the actual capital situation of the company. Expected charges appear as liabilities (credit) in the corrected balance sheet, counterweighted by the acquired asset, which is also included therein. (See Section 2.3.2.)

In theory, the same method could be used to include the costs related to employees in the balance sheet as well. The payment obligations expected to incur assuming normal business operation in connection with all current employees are to be accounted on the liabilities side (wage, benefits and taxes). This requires the estimation of the time expected to be spent at the company, which can be based on the normal fluctuation in the case of the position in question. The definition of the discounting rate is made easier by the fact that in most countries, employee claims have priority over creditors in the case of bankruptcy or liquidation, thus the expected profit on wages cannot be higher than the long-term credits of the company (that are not secured individually with a collateral).

Theoretically – if labour agreements are considered as the exchange of equal values – the same amount should be included among assets as human asset. In this case, human asset and human capital are equal. The process is based on the assumption that expected liabilities are re-estimated in the course of every valuation (annually in the case of manager benefits, for instance).

In which cases can this approach be used for valuation? Obviously, only if it is exclusively the liabilities that need to be assessed accurately, such as the case with respect to productive assets acquired through operative leasing. This is because the correction presumes that the given asset is required for the basic activity of the company, whose value is defined on the basis of future income, and from which liabilities (including the leasing credit) are deducted to give equity.

If the same approach is applied with respect to human capital, employees will become the creditors of the company. The value of the firm is then calculated excluding the costs related to employees from future income. Then, equity can be valuated by deducting not only credits but also human capital (payment obligations) from the value of the firm, since it does not belong to the investors but the employees. Following this method, the same result is given in theory as without correction, since the value of the income increase is equal to human capital. The modification would thus definitely not decrease the indebtedness indicator of companies, on the contrary, it would probably worsen the situation in the eyes of inexpert inspectors who consider human capital as a traditional external source. Thus, this system would enable the accounting of human capital in a manner that is not against the traditional methodology of company valuation.

If an asset-based valuation is conducted, the value of human assets cannot be estimated solely on the basis of expected costs. In this case, the valuation corrections linked to leasing also reach beyond inclusion in the balance sheet, since the object of the leasing is to be assessed independently, and the difference between the book value and the actual value is to be considered in the equity. Therefore, human assets need to be valuated in this case. The difference from the unrevised human asset value is to be included in equity, since investors actually gain the *extra value* of human resources.

Following the principles of asset valuation, it becomes immediately evident that future wages in themselves do not secure reliable estimations. (No asset's value can be estimated by only considering its current or future operation costs and ignoring profits.) As we have seen

above, there are three basic types of asset valuation methods, namely those based on (1) cost, (2) the market and (3) income. These rely on different assumptions, whose significance lies in the fact that the expenses related to human assets have to include the maintenance costs of all intellectual capital components whose existence the estimation method in question assumes.

Cost-based methods

1-a. In this case, the methods based on **historical cost** would mean that the total value generated by the current staff is estimated referring to the present value of all future liabilities *estimated on executing the labour agreement and pending at the time of the valuation*. This methods has the same problems as the traditional application of book value: it ignores the changes in the market situation and is entirely independent from the actual modified value.

1-b. As for the **substitution cost**-based estimation, the costs of recruiting the employee capable of performing the job in question are to be assessed. (See Lickert's model.) It is of utmost importance that it is not company positions that need to be filled, but the actual performance needs to be replaced from external sources. This requires labour market data and the benchmarking of companies that pursue similar activities.

This method may reveal significant development opportunities, since it questions the current division, organisation and hierarchy of work. The system employs severe penalties on dead time, overemployment, inappropriate organisation and unjustifiably high wages. (The extra wage costs incurring as a result of the presence of string trade unions should be presented separately, as an asset of negative value.) On the other hand, the human assets of companies that operate more efficiently than the average can significantly exceed human capital.

1-c. The **replacement cost** concept is essentially identical with the substitution value, adding that the extra expenses related to recruitment, coaching and dismissal would also need to be expressed in terms of numbers. (See Lickert's model.) The principle of this approach is to specify what extra costs would incur if the company had to part with the employee performing the task in question for some reason.

Since recruitment and dismissal expenses are to be depreciated in the expected term of employment, this approach casts light on the value generated by loyalty: more loyal

employees need to be replaced less often, which means that the annual depreciation will be lower. The attractiveness of the organisation (non-financial benefits, workplace atmosphere, management style) also generate value in this approach.

If costs-based approaches are applied, the human added value includes all components of the organisational intellectual capital that affect the productivity of the staff, since the expenses linked to the workforce demand existing under the given circumstances are assessed. The added value shown is made up by the loss caused by unused organisational knowledge (better organisation of work recognised but not yet implemented) and the profit exceeding costs (originating for instance from a better motivation system, loyalty and non-financial benefits).

Market-based methods

2-a. **Realisable value** can only be used to a very limited extent in the valuation of human assets. Actually, the present value of the net income the company could realise by utilising the employee in an alternative manner should be given here. An estimate of this amount can be given on the basis of the income realisable by renting out the staff. However, this value can be specified only in the case of particular special professions, including certain services (accounting, security, maintenance) and jobs that are greatly standardised and do not require specialist knowledge. The applicability of an estimate may be limited by certain clauses of the labour contracts made with employees. (The Academy of Music could hardly expect its teachers to play in bars in the evenings.)

2-b. **Outsourcing value** can be defined by specifying the price for which the work performed by the employees could be purchased from an external enterprise. Transactions should also be considered when making the estimate. This method is practically only feasible in the case of the works discussed with respect to the estimate based on realisable value, and we must keep in mind that not all works can be outsourced.

Market-based valuation systems define the added value generated by employees on the basis of the intellectual capital generally available on the market rather than the

specific intellectual capital components of the company that are related to the specific workforce.

Income-based method

3. **Income-based value** is defined on the basis of company data by specifying the net income realised from the work of the given employee. Thus, the realised income (and value) depends also on the organisation of work, management, leadership and motivation, that is, this method covers the widest range of value-generating effects. On the other hand, this method has the largest time, information and cost requirements. (It must not be forgotten that when net income is defined by means of realisable value and income-based valuation methods, salary-type expenses are to be excluded, since they have already been accounted for on the liabilities side.)

According to Becker's model, the income generated for the company can be approximated through the marginal product of the employee's work. This can be done in practice by expressing the increase in company income originating from one additional work hour (work piece) in terms of numbers.

Since the income-based method considers the effects of all intellectual capital components of the company related to human assets, the defined added value also includes the value thereof. Thus, the intellectual capital components of human asset influencing productivity can only be interpreted with respect to the specified added value.

Naturally, the company has to continuously amortise the accounted human assets. This should be done by employee, especially in the case of staff members who are not "mass workers" as Neuman and Segev (1978) put it. The application of an average fluctuation figure may lead to serious inaccuracies, since the difference between the salaries of employees with different qualifications and in different positions continuously grows and the group could hardly be considered as homogeneous.

Depreciation should not be computed in a mechanical manner, referring only to predefined ratios, but should rather be corrected on a regular basis (annually in the course of performance valuation), in line with the expected time of leaving the company. Thus, a company that plans to implement significant cut-back in the next year will be forced to account substantial human asset and capital reductions in its balance sheet. (This way, if the

dismissed employees were generating value, equity may also drop.) The human assets and capital of the companies that manage to develop employee loyalty, however, will rise, along with the equity (if the value generated exceeds related costs), since the profits estimated using various methods will expectably last longer.

The non-financial benefits provided by firms generate value by (1) reducing the wages expected by employees (same profit with lower expenses), (2) increase loyalty, reduce fluctuation (the term of generating income is extended, replacement costs incur more rarely), and (3) increase efficiency (more profit with costs unchanged).

If one of the above methods is used on clearly separable groups of employees instead of individuals, an average value of some sort can be defined. This approach is less accurate, but it requires less information and time, and may thus prove significantly faster and cheaper than the detailed analysis.

The calculated value will be divided by the liabilities attributable to the group of employees in question – applying estimates of the liabilities based on average cost – to define the *multipliers* proposed by Giles and Robinson that describe the relationship between value and wages. Since this method offers a realistic alternative only in the case of largely homogeneous groups of employees, it may prove much more fruitful to contradict their model and generate multipliers applicable to large groups of employees who perform the same task and have identical skills (truck drivers, warehouse staff, seamstresses). (There is hardly any point therefore in computing *average* indicators for medium-level and top managers.) Familiarisation with the rates can also help the company concentrate in the course of recruiting new employees on the development of activities where human resources can be utilised in the most effective manner.

The approach to human added value outlined above can be effectively used even if it is not the intention of the company to include employees among liabilities in the balance sheet. In this case, reports can follow the traditional logic and specify only the other resources, so the difference between *asset and liability value* computed in the manner described above, that is, the **human added value** is to be included among assets. This difference comes from the fact the employees of a company generate more value than the total of the costs incurring in connection therewith. This logic is in perfect harmony with the concept of generating value, since the above difference is the factor that actually increases the market value of equity.

The application of this concept will render it impossible to increase the value of the firm (or its assets) by simply recruiting new staff members, which cannot be said of the methods previously proposed in professional literature. In this approach, the only source of generating value is that the expenses related to human resources remain below expected related income (profits). This can be achieved not only by reducing costs (bargaining of wages, non-financial incentives, increasing loyalty), but also by increasing generated income (better motivation, organisation of work, leadership, exchange of information, utilising knowledge, work conditions improving productivity).

There are numerous views in specialist literature concerning the distribution of the calculated added value between employees and managers. It is often argued that all added value should be credited to the managers, since it is them who combine the appropriate production factors (in this case: work and capital) in a manner that the company can generate income in excess of the price of resources and the costs related to their transformation. However, if we continue along this line: managers are appointed by the owners, that is, it is them who combine the management resource with the rest of the factors, so all added value should be credited to investors. Therefore, the added value linked to the workforce should also be considered as an increase in shareholder value.

Since the goal of the valuation is to define the value of the firm or shareholder value, the exact distribution of value between managers and employees is of secondary importance. This will matter more in the case of assessments of motivation and performance, where the possibility to include qualitative viewpoints renders the definition of a numeric value is not crucial, thus methods much more complex than those discussed above (e.g. ScoreCard systems or interviews) can lead to far more accurate results, which may serve as the basis for the allocation of value added by the group of employees in question, if needed.

3.3.2. The problems of valuating management

According to the traditional valuation approach, management continuity and various risks underlying management are given great importance. The mapping if these factors may be crucial with respect to the predictability of the prospects and future of the company.

Bosma et al. (2002) surveyed one thousand newly founded Dutch firms between 1994 and 1997 in the framework of a representative study. They used this as the basis to show that out of human capital components, in addition to general qualifications, industry-specific knowledge (experience) played a significant role, along with experience in setting up and managing a firm. Social capital (relationships) is also an essential component.

Therefore, if it is the management to be valuated, it is mostly the total of the above skills that needs to be considered, while in the case of employees, usually only general knowledge and relevant experience generate value for the company. Brealey and Myers (1999, Vol. II, pp. 456-457) bring it up among the ten unsolved problems of accounting that the management of a company may represent a factor affecting value that is excluded from the balance sheet. They believe this might explain why certain companies are traded at the stock exchange below the book value of their assets. (Taking into consideration that accounting applies the principle of caution and normally underestimates in comparison with the market.) The answer is that in this case the market believes that the future decisions of the management have negative net present value, thus the value of growth opportunities are also negative.

Valuation methods

Management constitutes an element of human resources, therefore it is very difficult to valuate it separately. The methods used for the definition of value are essentially identical with those outlined above, so I will only discuss particular unique characteristics of valuation here.

Wage-based approach. Assuming a close relation between wages and generated value, it could be argued that managers should simply be assessed on the basis of their benefits. Some experts claim that underpayment is less significant here, since the market is more balanced and competition is fierce. It is also in the personal interest of the members of the Board of Directors to establish realistic salaries: it is unlikely that they would be willing to pay more to a manger than the generated value, since this would mean that their own income is reduced.

The interviews made by Master (2002), however, suggest that the manager market is not always effective even in the United States. His research shows that when selecting a new manager, companies usually turn to head-hunter companies that are interested in fast success. Accordingly, even if they find four or five potentially suitable applicants, they will only introduce the one they deem the best to the directors. Since the applicant does meet all

requirements, the management of the company often simply approves of the decision made by the head-hunter, and employs the same company to define the suitable salary. This practice leads to the disappearance of market competition: the selected manager is already in a monopolistic position during the negotiations, and there is no competition in connection with the definition of the salary.

This practice is preserved by the fact that companies simply apply benchmarking instead of actually measuring performance when managerial benefits are revised. Since all companies in the comparison group act similarly, those in the lowest quarter always correct upwards, which sends other companies to the end of the list, and this may eventually lead to the development of a wage spiral (Master, 2002).

According to a survey conducted cited by Knight (1998, pp. 219-221), there was practically no relationship between the salaries of general managers in the United States between 1994 and 1996 and the value generated by the company in the same period.

Profit-based approach. Strassman (1990, pp. 88-89) suggests that the difference between the profit expected by investors and actual profits should be considered as the value generated by the management. Although he fails to explain his concept in detail, this would certainly make sense only if we take the cash income and the market value of invested capital as the basis of calculations. In this case, however, practically the entire added value generated by the company is credited to the managers (those creating the combination of factors used).

This approach is fundamentally different from the asset-based approach that wishes to link value to individual production factors utilised. Furthermore, since the management in question was selected by the owners, it would appear logical to claim that added value should be credited to the investors.

It is also a problem that manager skills can usually not be estimated realistically on the basis of their optimistic plans (cash-flow forecasts) but only relying on their past performance. Also, the above approach would credit the changes in the market value of property and credits (including the realisation thereof, depending on the type of measurement) to the management, which is hardly acceptable.

3.3.3. Valuation of the firm's dependence on key persons

In many cases, the value of a company or business is fundamentally influenced by the contribution of a single person. The value of medical and legal practices, of a restaurant

relying on the appointment of a famous chef, or of a business consultancy organised around a leading expert with good business relations is largely made up by the work of the key persons. The situation is no different with respect to the majority of confidential services such as tax consulting, hairdressing and locksmithing performed for households.

In these cases, the exact objective of the valuation needs to be defined first. During liquidation, the effect of the above is negligible, and its significance is low even if the goal is the definition of the going concern value for the purposes of e.g. paying premiums or an inheritance. In the case of a transfer to a new owner, it is normally practical to set up two evaluations, i.e. in addition to the going concern value, the performance realisable if the key person left the company should also be specified.

There are several methods available to reduce valuation uncertainty. First, an agreement can be entered with the key person concerning continued cooperation before concluding the transaction, or the coaching and training of suitable replacement can be set as a requirement. The third option is to include a clause in the contract forbidding the former key person from setting up a similar business in the foreseeable future.

Pratt (2001, pp. 224-236) warns that in the case of companies that depend heavily on a few key persons, not only migration, but also death and disability represent risks. This is particularly true in the case of small-scale technology-centred businesses and the firms where sales depend greatly on personal relationships or research is concentrated around a single expert.

Pratt defines the following groups of the types of potential loss (as quoted before, p. 224):

1. Relationships with suppliers
2. Relationships with customers
3. Employee loyalty to a given person
4. Unique market approach, knowledge or skills
5. Unique technological and product innovation ability
6. Special managerial and leadership skills
7. Financial strength (ability to gain credit or equity, personal guarantee)

Since the above factor affect the entire company, the importance of the key person can be defined on the basis of the value of the firm in question. Pratt quotes the analysis of Bolten and Wang, in which they discussed the effects of 101 top managers leaving their companies. The average price drop was 8.65 percent in the case of small-scale companies, while large

businesses only experienced a decrease in share prices amounting to 4.83 percent on average. (As quoted before, p. 225) Where management consisted of fewer than six people, the average drop was 9.43 percent, while in the case of companies with more than 16 managers, it only reached 2.65. Their experience suggests that unexpected departures (death cases) resulted in price decreases significantly in excess of the average, reaching above 10 percent.

Because of the dependence upon the key person, the following factors are to be considered when the applicable discounting rate is defined:

1. The services provided by the key person and their dependence upon the given person
2. The probability of losing the person in question
3. The quality of company management
4. The availability and ability of potential replacements
5. The income of the key person and the income requirement of a potential replacement
6. Value of lost and irrecoverable factors (important customer and supplier contacts, familiarity with the market, reputation, organisational harmony generated by managerial style)
7. Risks related to the change and the new management
8. Loss of ability to draw on credits

Because of the above, the applicable discounting rate is unique in every single case, and it needs to be expressed as a number for each manager rather than for the entire company. In the cases collected by Pratt, various courts in the United States ruled that a discount between 10-25 percent was reasonable.

In his examination of the practices related to a single person, Pratt (1992, pp. 297-307) found that their value greatly depends upon the personal professional goodwill of the expert in question. By that he means the reputation, client base and references of the specialist, along with the trust of the customers towards them. He believes that this value can be transferred to the new practitioner, albeit only through a difficult process (by convincing customers personally, for instance).

3.3.4. Incentive system

While the value of human resources is determined by its performance, the related costs, that is, its price can be specified on the basis of the incentive system, including the wage system as well as various non-financial benefits, that all have a fundamental effect on performance. Many claim that the incentive system is part of the company culture, others view it as a value-generating factor rather than a quasi asset. Since an incentive system resulting in higher performance may increase the value of the firm, I share the former opinion.

Ehrbar (2000, p. 28) and Camp (1998, p. 126) both emphasise the influence of the incentive system on generating value, although from different viewpoints. According to the, an appropriately set up system will help synchronise personal premium goals and the task of the company to increase value. That is, a good incentive system supports the increasing of he value of the firm, whichever method we choose to measure it. In practice, this means that the company can secure higher performance with lower (wage) costs. The easiest way to evaluate this is the application of the discounted cash flow (DCF) method. The incentive system based on generating company value will lead to the increasing of the value of the company, since employees will treat the business as their own, which means it will operate more effectively with lower costs (Black et al., 2001, p. 122).

Knight (1998, p. 6) points out that this is only possible if the incentive system suitably supports the strategy. The importance of appropriate internal performance measuring is also stressed by Ernst & Young (1999). Their experience suggests that numerous companies measure what they can measure instead of what is important with respect to the strategy and the generation of value (as quoted before, p. 158).

In Section 3, I have revised company synergy and the quasi assets constituting it. This group of factors is characterised by the fact that they can only be managed and not owned by the company, thus their parts cannot be sold separately. Out of the various classifications, I chose to apply the triad of organisational structure – human resources – synergy.

Organisational structure comprises the factors that are independent from the person of staff members. Its most important parts are the strategy, the company culture, the company information system, various archives and external contracts and relationships. These latter are also linked to human resources through their creation and maintenance.

In my discussion of the factors of human resources, I have revised possible models for evaluation, and have considered the problems of the separate valuation management, the definition of personal dependence and the development of an incentive system.

The group of the discussed factors is far from being complete. Due to their unique characteristics, the synergic effects of various companies manifest in different ways. In addition, changes are also possible to these forms: coaching, for instance, transforms the culture and knowledge linked to the organisational structure into human capital, while recording employee experiences and including their habits in the system of rules turns human knowledge into an organisational quasi-asset.

4. REVISION OF HUNGARIAN SPECIALIST LITERATURE

In the past ten years, a number of articles, studies and doctoral theses have been prepared regarding company valuation and value-based company management. These focus on the definition of fair value in connection with the privatisation process, later, emphasis shifted to the generation of value, the assessment of the performances of Hungarian companies and the stability of models, and several specialist foreign works have also been published in Hungarian.

Due to the nature of economic trends, the primary question was how to define business value rather than how to distribute it, thus the problem of assessing items excluded from the balance sheet independently has been focussed on to a lesser extent. Although most works concerning company valuation do mention the necessity of correcting accounting reports, the authors usually fail to step beyond merely listing examples.

In the early 90s, attention was concentrated on the introduction of basic valuation principles and their application in privatisation. Csécsei (1991) and Nagy (1991) discussed the framework of valuation, the objective of the company and the role of the valuating expert. In his examination of the factors defining the value of the company, Nagy stresses that accounting data are insufficient for evaluation, since they ignore such important components as the qualifications of employees, the quality of research and development or synergic effects. Osman (1991, 1992) discusses the contents of intangible and intellectual equity and also discusses the problems related to the application of particular valuation approaches.

Illéssy (1992) introduces basic company valuation methods and points out that inflation needs to be taken into consideration. In their discussion of company valuation methods, Ling and Nagy (1992) claim that it is not only the defectiveness of accounting systems but also the taxation system that may distort valuation results. In connection with asset-based assessments, they draw attention to the difficulties of valuing the intellectual assets excluded from the balance sheet. With respect to taking former transactions as the starting point, they underline that the changes of the regulation environment may pose serious problems.

In connection with the definition of privatisation value, Bélyácz (1992) argues that DCF methods should be applied, but he fails to point out their limitations. A few years later, however, (Bélyácz, 1995) he emphasises the difference between market value and internal

value: he stresses that market atmosphere and economic trends lead to permanent underestimation, thus prices that can be inspected do not necessarily provide a good basis for estimating the business value of the firm.

Considering the activities separated following of privatisation and the number of newly established holdings, Bőgel (1994) steps beyond the general introduction and examines how company divisions could be assessed individually.

The problems of regulating accounting were also the source of frequent debate. Tompa (1993) contested the legal regulation that required companies to assess the value of their assets synchronised with their income-generating capacity. The economic state of the time is well illustrated finding of the author that the total value of assets exceeded not only book value but also the value calculated on the basis of future income-generating capacity in the case of most companies.

Kerényi (1994) points out that the regulation which governs the valuation of the assets of state-owned companies when transforming into business organisations is based on a fundamentally mistaken concept, since the increasing of accounted amortisation brings about further inaccuracies in the system, while the value of the firm is left unaffected. He points out that the value of the firm is greatly dependent upon managers and the strategy, while the accounted value of the assets does not have a major influence on it.

In line with the growing number of actual assessment and privatisation cases, the theoretical shortcomings of traditional valuation methods surfaced increasingly often. Ulbert (1994a, 1994b) discusses present and remainder value through comparing German and Anglo-Saxon methods used for the definition of the discounting rate.

A year later he stepped further (Ulbert, 1995), and examined what effect privatisation and the economic transformation had on the applicability of particular company assessment principles. In connection with frequent dissolutions, he stresses the importance of liquidation, repurchasing and replacement costs. He points out, however, that it was not a realistic option to use the methods based on income generation in Hungary due to the immature state of the domestic capital market and corporate mentality (in 1995).

Discussing the development of company assessment methods, he stresses the significance of non-monetary indicators: in the transaction he defines as "strategic purchases", the parties rely only in part on monetary characteristics, which is partly due to the difficulty of forecasting. He cites the example of liquidating a competitor or purchasing market share,

among others. He also emphasises the importance of company- and industry specific factors: political, regulation and price risk all increase the profit expected of companies.

Matukovics (2003) focuses on property evaluation and discusses various approaches and the different types of obsolescence in detail. He also analyses the reasons behind the differences between the values computed according to various methods.

From the mid-90s, emphasis was shifting to various types of balance sheet corrections and the value of intangible assets. Angyal (1992) argues that the strategy of the company is a value of some sort that helps managers make decisions. He pints out that albeit this value cannot be expressed in monetary terms, its existence and quality can be crucial regarding the future of the company.

Tattay (1993) examined the relationship between privatisation and trade-marks. He suggests that the extra profit realisable on a long term should be capitalised in an effort to define their value. He believes the excess is normally 0.1-10 percent of the turnover. Alternatively, he proposes that the reproduction value of trade-marks should be used, which could be approximated through the costs related to designing, copyrighting and introduction to the market.

In his discussion of property assessment, Felföldi (1994) also mentions the importance of the intangible assets excluded from the balance sheet. Reszegi (1994) takes the example of the privatisation of Chinoin privatisation to consider the specific role of the management as seller, the imperfect information available to the foreign buyer and the difference between the values represented to different potential customers. With respect to valuation methods based on multipliers, the author points out that non-recurring items, provisions, leased assets and special amortisation techniques make it necessary to correct the balance profit. He also draws attention to the fact that due external factors already considered in the forecast for standard income (low wages), multipliers based on an international comparison should not be corrected, since that would lead to double accounting. He stresses the significance of the problems related to R&D and the handling of the related risk. A year later, Bauer (1995) focuses on the importance of brand value as well as the problems of its management and monetary assessment.

Laáb (1994) discusses the value and possible valuation of human capital, emphasising that the development of employees is one of the best forms of investment. With respect to the utilisation of human capital, Angyal (1995) stresses that unlike in the case of other productive factors, this area makes it necessary to consider psychological and social connotations in the

course of optimising. He claims that a purely money-based system is unsuitable for both motivation and the measurement of performance, thus the effectiveness and quality of human resources management cannot be grasped using solely monetary indicators.

Bőgel (1998) divides intellectual capital into human, structural and customer capital and points out that these areas are mutually overlapping. He mentions the significance of key persons, and believes that attracting employees from other companies may be a method of acquiring intellectual capital.

Eperjesi (1999) uses essentially the same division, and discusses the possibilities of assessing and accounting intellectual capital. The goal of their introduction is measuring performance, supporting decision-makers and providing investors with more reliable information. He stresses that the tracking of such components of property also requires non-financial indicators, and he also gives a detailed list of possible rates.

Hoványi (1999) claims that the successful company is a learning system, since thus it can improve its flexibility and utilise intangible resources more fully. Kovács and Lévai (2000) argue that human capital needs to be audited. They introduce human resources accounting and urge that the human policy activities of companies also be audited, since these affect the value of the firm on a long term.

In his examination of small and medium-sized enterprises, Kozma (2001) emphasises that with respect to effectiveness (i.e. the capacity to generate income), the professional knowledge of the management and their familiarity with the market are of crucial importance. Katits (2002) analyses the financing structure and outlines a general model for the definition of the capital structure maximising shareholder value, which means generating value on the liabilities side, that is, the rejection of the classic fundamental assumption of the CAPM model. Komáromi (2002) also assessed the relevance of the theory of effective markets, introducing the theory of financial behaviour as an alternative.

The literature related to financial performance measuring has also dynamically expanded. Bordáné (1986, 1990, quoted by Dorgai, 2002) believes that accounting is suitable for supporting the decision-making of managers, and focuses primarily on the interpretation of various indicators. Hajdú and Virág (1993) and Virág (1996) set up a model for forecasting bankruptcy on the basis of the analysis of the balance sheet and the profit and loss account from a financial viewpoint. The controlling-based approach to performance measuring is discussed by Bodnár (1997, 1999), while Wimmer (2000) analyses the relationship between company operation and financial performance. Dolgos (2000) examined the relationship between logistics and performance measuring, and Dorgai (2002, 2003) discussed the

relationship of value maximisation and performance measuring. Fónagy-Árva, Zéman and Majoros (2003) introduced the possible applications and the limitations of value measurement methods.

Parallel to the above, the publishing of various approaches to value became increasingly frequent. Salamonné and Bőgel (1996) analysed the value chain as a bridge between customer and shareholder value, while Wimmer (2003) offered a summary of the change in the value-orientation of company management. Czakó (2003) discussed value from the viewpoint of strategic management, Chikán (2003) did the same with a corporate economy approach, while Berács (2003) based his analysis on marketing, They also deal with the development of the concept of value in the various fields.

5. THEORETICAL SUMMARY

It is a worldwide tendency that the difference between the book value and business value of companies is increasing. The goal of this thesis is to analyse the reasons of this difference, that is, to revise the items excluded from the balance sheets of non-financial companies. According to the applied definition, this circle includes all factors that explain the difference between the business value and the book value of the firm.

In the first section, I offered a revision of the methods of defining the value of the firm company. As per the definition applied in this thesis, the fair value of a firm assumes that the current strategy is followed, operation is continuous and all relevant information is available.

Then I discussed various categories of value, valuation methods and the limitations to their application. The price used in performing a given transaction depends upon the person conducting the measurement as well as the circumstances, purposes and method of the assessment. Accordingly, there are more than one assessment methods.

The overwhelming majority of assessment methods are based on the accounting reports of the company to be valuated. These input data, however, may be distorted, faulty and defective from a valuation point of view. In this context, I provided an overview of the most significant sources of errors in accounting reports, along with the possible ways to resolve them.

Three types of corrections have been identified with respect to statements. (1) There is no general rule for the correction of accounting distortions and defects. Correction is nonetheless possible in individual cases through reliance upon the discussed principles. (2) Non-recurring items are not relevant regarding future operation, therefore these factors are to be removed from forecasts in order to be able to focus on the standard income-generating capacity. (3) The value of assets not required for operation that do not operate thereto are not included in the valuation models based on corrected reports. These are to be assessed separately, then the price is to be added to the calculated business value.

Through the comparison of the principles of defining fair business value with the practice of preparing accounting reports, I have identified three groups of items excluded from the balance sheet that explain the difference of the two values: (1) the difference between the book value and the fair value of accounted assets, (2) the fair value of company assets excluded from the balance sheet, and (3) the value of synergy or quasi assets that generate added business value but cannot be sold separately.

The second part of the study was devoted to examining the corrections to company reports required to ensure that they better fit the concept of business valuation. In this part, I did not only focus on the correction of the book value of recorded components, but also examined the definition of the value of items that are considered assets and liabilities from a business viewpoint but are excluded from accounting reports. I detailed possible corrections to the asset and liabilities sides of the balance sheet and the primary principles thereof, analysing the problems that arise in the course of defining the fair value of company assets.

Although correction may become necessary for each and every item, only some of these are justified at a particular company, since a number of them are irrelevant and have only minor effects. This collection of items can be used as a – hardly comprehensive – check list to prevent serious inaccuracies when applying a certain evaluation method.

Section 3 is devoted to the listing and assessment of the last group of items excluded from the balance sheet, namely synergy and quasi assets. In my revision of the most important trends of analysing intellectual capital, I identified the factors that can only be managed (and not owned). Although their monetary assessment is rather complicated at times, accounting for them helps the tracking of changing as well as the effective management thereof.

The revision of the problems related to items excluded from the balance sheet was concluded in the fourth section by offering a summary of the history of Hungarian specialist literature in the past ten years. In the 90s, Hungarian authors discussed valuation techniques and the difficulties related to their application mainly in connection with privatisation. While 8-10 years ago the applicability of Western valuation systems in Hungary was assessed, emphasis shifted in recent years to valuation being a possible tool to improve competitiveness, and an increasing number of experts question even the fundamental assumptions of common methods. In addition to the spreading of financial analysis, modern corporate finance and the measuring of financial performance, the new trend is to attempt to synchronise the concepts of value used in different scientific fields.

The most important finding of the analysis conducted so far may be that the accounting reports of a company in themselves, without supplementary information, can be used for valuation and the comparison of company performances only to a very limited extent.

The accounting system set up for the information of external stakeholders and the accounting systems developed to assist internal information, especially the management have different purposes and are thus necessarily different themselves. The detailed analysis of the problem of off-balance sheet items casts light on the justifiability of independent systems for

measuring performance, supporting decision-making and management accounting, since these may provide the management with the information required to base their decisions upon.

If the principles of collecting, organising and assessing information are different from the principles of decision-making, optimisation suitable for the given conditions (the maximisation of value) cannot be conducted, or will lead to a faulty result and erroneous decisions. The estimation of the amount of invested capital and the expected profits are two very good examples: if the input data are inaccurate, the decision-maker will not be able to select the most favourable alterative from the available options. This does not only act against company strategy, but also jeopardises the attainment of the basic objective of the company, be it the fulfilment of customer needs or the maximisation of shareholder value. This, in turn, will cause the economic system to be unable to efficiently allocate the resources at its disposal, that is, market coordination will not be effective from in any respect.

The identification of differences may also help bring the accounting and financial approaches closer to each other, which would greatly promote the perfection of company information systems. For example, with respect to intellectual capital (intangible assets), a different type of recording is also required, which would probably not be based entirely on monetary valuation. Finding the solution for the continuous measurement of these company inputs and outputs that are related to the relationships maintained with various involved groups and are often immeasurable both physically and financially may be the greatest of challenges the developers of company information systems will face in the coming years or even decades, along with the application of the results in company management, forming strategies and making investment decisions.

6. EMPIRICAL SURVEY ON THE ROLE OF THE OFF-BALANCE SHEET ITEMS

Having considered theoretical questions, I will now continue to verify the practical applicability of the most important principles and conclusions. Accordingly, my research is primarily of an exploratory and explanatory nature. (Babbie, 1996)

6.1. THE PURPOSE OF THE RESEARCH

I shall use the theoretical overview as the basis to clarify three groups of questions. These verify the relationship of book and business value, the extent of their difference as well as the industry- and country-specific characteristics thereof.

(1) First, I will examine the relationship between the book value of a firm and its value calculated according to the business approach. Foreign research suggests that the changes in the book value are closely linked to the business value (see Bernard – Noel, 1991, Barth – Clinch, 1998, and Aboody – Barth – Kasznik 1999, quoted by Barker, 2001, p. 122-123). The international experience discussed in the theoretical part also show that the gap has been widening in recent decades (Boulton- Libert, 2000, Personnel Today, 2002).

(2) In the second part, I will attempt to explore the reasons behind the difference of book value and business value. According to several surveys (Sougiannis, 1994, 1996, Aboody and Lev, 1998, Barth et al., 1998), the supplementation of the information found in the balance sheet can help prepare a more accurate estimation model.

(3) Finally, I will examine the extent of the difference between the book and business values, and whether its changes are affected by industry- and country-specific factors. Earlier research (Ling-Nagy, 1992) suggest that the average ratio in various industry segments in the United States were substantially different. This is due in part to the different asset structure and the different significance of quasi assets, and partly to the different profitability and growth prospects of the sectors in question. Country-specific variations are due to differing macroeconomic prospects, regulation environments and infrastructural background.

6.2. THE RESEARCH MODEL

In an effort to answer the questions defined in Section 6.1., I have set up a model on the basis of the theoretical background outlined in the first part of the thesis. The research model is illustrated in Chart 7.

Research model

Book value · Measured off-balance sheet effects · Measurement error type 1 · Measurement error type 2 · Observable part · Distortion · Market value · Market efficiency · Fair business value · Off-balance sheet items
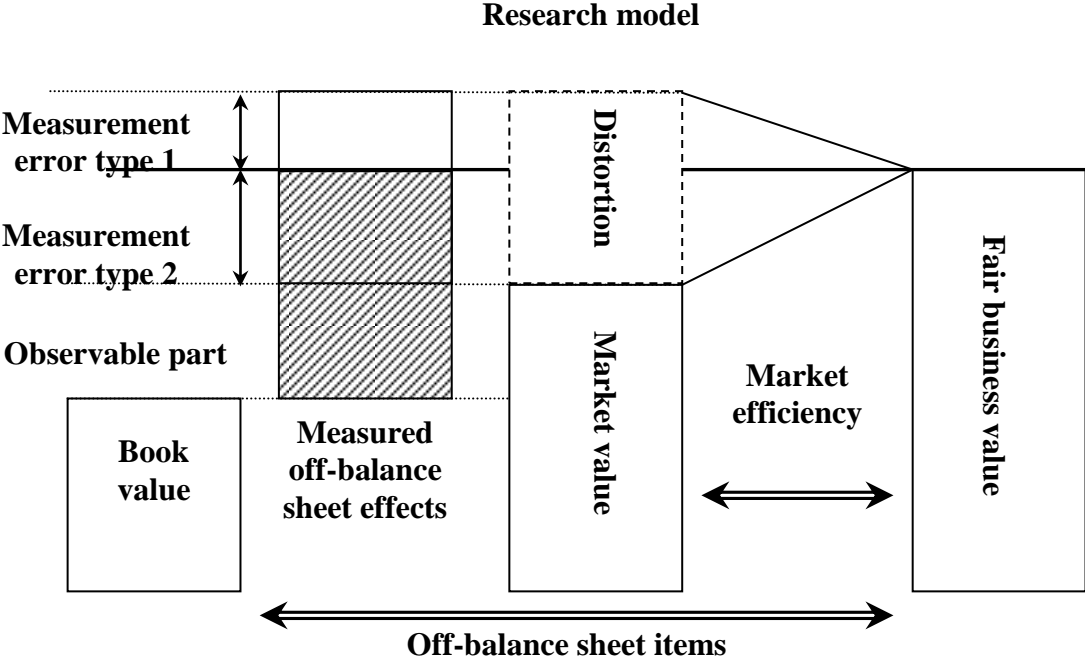
Chart 7

I defined the amount of off-balance sheet items as the difference between the fair business value and the book value. Since the specification of the fair business value would only be possible in the course of a very detailed analysis based in internal information, this difference will not become directly apparent in the survey. Thus, I will be forced to rely on estimations concerning the definition of business value.

As an approximation, I will use the market value of the shareholder capital and credit of the firm (i.e. the company itself). Accordingly, I considered the share and bond prices of companies listed at the stock exchange. This approach, however, may cause inaccuracies in the measurement: depending on the examined period and the effectiveness of the market in question, the market price may either be an overestimation or an underestimation of the business value.

The gap between the market value and the fair business value is explained by the theories discussing the efficiency of capital markets. Although it is far from proven that various national capital markets are efficient, since the objective of my survey is to identify the items that have an actual effect on value, it is sufficient for me to assume that the distortion existing between the business value and the market value affects all items excluded from the balance sheet to an identical extent, that is, any problems related to efficiency will only influence the absolute value of the off-balance sheet items, and leave their explanatory strength unaffected.

In order to eliminate the inaccuracy deriving from the size of the company in question, I will not consider the absolute difference between the business value and the book value but their relative ratio. (Hypotheses have also been formed on this basis.) Therefore, corrections are to be performed also with respect to various explanatory variables.

The distortion caused by inflation (for details see: Radó, 2004) may also be substantial. Since the combined effects of a price increase differ depending on the nature of the activities of the company in question, inflation in itself may increase the difference between the results of market valuation that relies on the current situation and accounting measurement based on historical data, but the price increase in itself will reduce the business value of the firm (extra tax obligations for the apparent profit, amortisation replacement loss), which in turn reduces the ratio.

6.3. RESEARCH HYPOTHESES

There are three hypotheses related to the question of the relationship of book value and business value:

H1: There is a positive relationship between the book and business values of companies.

The purpose of accounting reports is to present the financial state and effectiveness of the company. Albeit valuation from a business point of view differs from assessment based on accounting in several aspects, the system of goals applied by the two systems are practically identical, and the primary input source for a business valuation is the same economic information the accounting system is based on. Thus it can be assumed that the correlation between the results of the two different measurements and between the changes to these results is positive and strong.

H2: There is significant difference between the book and business values of companies.

International experience shows that book value has become increasingly different from business value in the recent decades (along with the rise in the importance of intangible assets and the spreading of special financial products). A comparison of the book and business values of a company will show how realistic a picture accounting reports in themselves can give regarding the financial and income generating state of the company or its business and market values.

H3. The difference between the book and business values of companies has increased in recent years.

According to international experience, the gap between accounting and business values is continuously rising. Following the specification of the extent of distortion, it is worth determining if it is apparent everywhere. This will serve as the basis to make conclusions concerning the geographic differences in the significance of the items excluded from the balance sheet.

I have defined four hypotheses in connection with the assessment of the reasons behind the difference of business value and book value:

H4. The structure of the balance sheet does not have a major impact on the ratio of the business and book values.

The individual approach of companies to the balance sheet may in theory affect the indicator, since the difference between business and accounting valuation approaches varies for each balance sheet item. The share of invested assets in the equity, which reflect inflation inaccuracies to a greater extent, the applied asset valuation method and the uncertainty of customer receivables may also influence the ratio significantly, similarly to asset composition.

According to international experience, however, the overwhelming majority of the business value of companies comprises assets and other factors that are excluded from the balance sheet. The gap between the value of assets calculated from an accounting or a business viewpoint is on a significantly lower scale, thus the value of the indicator is only affected to a negligible extent by such valuation distortions.

H5. The ratio of the business and book values is influenced by such company-specific items that are excluded from accounting statements.

According to the discussed theoretical background, the assets and quasi assets excluded from the balance sheet also have a major impact on the indicator. Self-created intangible assets (brands, research and development), accumulated intellectual capital, unique competitive advantages may all contribute to the difference.

H6. Inflation has an effect on the gap between the business and the book values.

Specialist literature claims that price increases may cause severe distortions in accounting statements. The valuation principles for various groups of assets differ, and so may the procurement and replacement or market value of the assets owned by the company for a long time that are not recorded at their market price.

H7. The tendency of the business and book values to change with time is influenced by the composition of the group of variables explaining their difference.

The values of certain groups of off-balance sheet items show different changeability characteristics. While assets (regardless of whether they are included in the balance sheet at a particular value) can in theory be sold at any time on market conditions, quasi assets and synergy are only valuable to the given company or are indivisible therefrom. This is why the company-specific risk of this latter group of assets is significantly higher, i.e. its volatility is also expectably higher.

Since the ratio of the business and the book values is explained by the combination of these two groups of factors, the rate is to be less volatile with time in the case of companies where the value of assets excluded from the balance sheet is dominant than at firms where the gap is mostly due to synergic effects.

The following hypotheses account for the industry- and country-specific differences of the book and business values:

H8. The gap between the business and book values is affected by industry characteristics, thus the rate will significantly differ across sectors.

The difference of the indicator in question may be affected by a number of industrial factors. Since the growth prospects, development cycles and technology (composition of the required combination of resources) may be very different in various industries, the ratio of the book and business values may also differ significantly.

H9. The ratio of the business and book values is affected by company- and region-specific factors, thus the rates in the same industry will vary from country to country.

In addition to the distortion factors discussed so far, there are country- and region-specific effects (macroeconomic trends, infrastructure and labour market conditions) that contribute to the indicator. These affect all participants in the economy of a certain country (region), thus cross-border comparison is needed to identify them.

6.4. METHODS OF DATA ANALYSIS

6.4.1. Assessed data

For the purposes of the assessment, I created a database, which contains the annual data of 4,108 companies for the period between 1999 and 2002. (The variables are summed up in Table 15.) I supplemented the database with the data of the foreign economy analysis conducted by the Hungarian Ministry of Foreign Affairs (Ministry of Foreign Affairs of the Republic of Hungary, 2003). I derived ten quotients for each year from the base variables in order that data from companies of different sizes and preparing their statements in various currencies become comparable. This was then supplemented with approximately twenty more indicators describing annual change.

Base variables assessed

Operation headquarters (country)
Region of operation (four regions)
Industry
Beta (CAPM)
Market value of the firm (1999-2002)
Invested assets (1999-2002)
Tangible assets (1999-2002)
Intangible assets (1999-2002)
Cash holdings (1999-2002)
Total assets (1999-2002)
Equity (1999-2002)
Long-term credits (1999-2002)
Table 15

Share price and balance sheet data are from the database of financial data provider Bloomberg. The market value of the firms was included directly in the database: in the course of the definition thereof, traded shares and bonds were taken into account at their market price, not traded securities (preference shares, drafts) and long-term credits and loans were considered at their book values. (Assuming that creditors are rational, i.e. neither party is repeatedly mistaken, this has to be equal with market value on average.)

The selection of the companies was based on the information requirements of the hypotheses: the sample includes no credit institutions, financial service providers, holdings and conglomerates with diversified activities. Thus, the different balance sheet structure of the

companies that pursue financial activities and the funding role of holdings are excluded, and unclear industrial classifications do not cause uncertainty in the sample.

It is a problem, however, that the database of Bloomberg does not contain all financial data of all traded companies that operate in the given region. As for Eastern Europe, for instance, only the data of the companies traded in the top classes of stock exchanges were available. This reduces the distortion caused by the ineffective pricing of certain shares due to illiquidity, but it also reduces the number of items in the sample, and thus limits the possibility of providing an independent statistical assessment of various countries.

The sample includes various data from 63 different industries and 31 countries. There are fewer than ten firms from 12 countries, but more than one hundred from 6 other ones, while in the case of industries, 13 has over a hundred items, and 10 below ten. The structure of the stratified sample is shown in tables 16. and 17.

Distribution of the sample according to region

Region	Number of items (N)
United States	3,016
South America	182
Western Europe	713
Eastern Europe	197
of which Hungary	*18*
Total	**4,108**

Table 16

The high number of items from the United States gives a good picture of the effectiveness of the valuation of the US GAAP accounting system, while the more than 700 firms from Western Europe may be relevant with respect to the description of the region, since there are approximately 6,000 traded companies in the European Union, which means that the sample covers over 11.5 percent of the total.

Largest industries and countries in the sample

	Industry	N	Ratio		Country	N	Ratio
1	Telecommunications	237	5,77%	1	USA	3016	73,42%
2	Retail	236	5,74%	2	Germany	172	4,19%
3	Commercial Services	206	5,01%	3	Turkey	148	3,60%
4	Software	206	5,01%	4	Finland	119	2,90%
5	Healthcare-Products	205	4,99%	5	Brazil	103	2,51%
6	Computers	204	4,97%	6	Sweden	102	2,48%
7	Electronics	182	4,43%	7	Norway	79	1,92%
8	Pharmaceuticals	170	4,14%	8	Chile	76	1,85%
9	Oil & Gas	130	3,16%	9	Greece	47	1,14%
10	Food	114	2,78%	10	Netherlands	43	1,05%
	Sum of first 10	**1890**	**46,01%**		**Sum of first 10**	**3905**	**95,06%**
	Total sum	**4108**	**100,00%**		**Total sum**	**4108**	**100,00%**

Table 17

Distortion due to the composition of the database as well as validity and reliability problems may arise for particular countries because of the low number of sample items. Validity depends on the extent of the relationship between the phenomenon assessed and the variable monitored (i.e. as it is already apparent from the assessment model: market effectiveness), while reliability originates from the accuracy of measurements. The latter is of smaller significance, since annual reports are verified by auditors, and stock exchanges and financial supervisory authorities ensure compliance with the rules of accounting. (The companies involved in the great accounting scandals of recent years are not included in the sample.) The accuracy of market (stock exchange) data is guaranteed because they were taken from the database of the official data provider.

The ratio of the market and book values

	1999	2000	2001	2002
USA	**4.2489**	**4.2432**	**3.5978**	**3.0743**
Western Europe	**4.3880**	**3.7509**	**2.5296**	**2.4033**
Sweden	4.6225	3.5070	2.4340	1.9206
Germany	n.a.	5.2758	2.4693	1.6623
Finland	5.9468	3.5237	2.2455	1.6607
Eastern Europe	**5.8922**	**3.0080**	**2.9376**	**1.9394**
Turkey	6.6229	3.3028	3.4608	2.0772
Hungary	2.5547	1.2972	1.0683	0.9789
South America	**1.5413**	**1.4711**	**1.4575**	**1.4669**
Brazil	1.6462	1.5231	1.3654	1.5104

Table 18

The database needed to be cleaned before commencing the examinations. During this process, I erased the accounting company values below zero due to negative equity recorded

in the books, since in this case the quotient of the market and accounting values could not be calculated, as the theoretical minimum of both values is zero, since the liability of the owners of joint-stock companies is limited, and creditors may lose the loaned amount at most. (That is, no one pays to a customer to buy shares or bonds from them.)

6.5. SURVEY RESULTS

I analysed particular hypotheses using multivariate statistical methods. Since the results of certain examinations answer more than one hypotheses at the same time, I partly integrated research assumptions, while in other cases they were verified individually.

6.5.1. H1 – the relationship between the business and book values

The first hypothesis (H1) concerns the relationship between the business and book values of a company. In an effort to examine this, I assessed the relationship between the book value of invested capital (the total of equity and the accounted value of long-term loans) (BV) and the market value of the firm (MV).

To verify H1, I assessed the correlation between the absolute values of BV and MV. Data suggest that the two value show close connection with respect to the entire sample (Table 19). Since this indicator can be substantially distorted by the nominal difference caused by accounting in different currencies, I also made the calculations separately for certain countries (with the largest number of sample items and relevance[31]) (Table 20).

The relationship of the book and market values in the entire sample *

		MV 1999	MV 2000	MV 2001	MV 2002
BV 1999	Correlation	0.863	0.886	0.898	0.860
	N	3454	3468	3470	3457
BV 2000	Correlation	0.824	0.886	0.904	0.869
	N	3449	3767	3773	3735
BV 2001	Correlation	0.824	0.853	0.878	0.854
	N	3452	3767	4050	3987
BV 2002	Correlation	0.837	0.798	0.844	0.839
	N	3436	3723	3978	4006

*Pearson Correlation. All correlations are at least at 0,01 level significant (2-tailed)

Table 19

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[31] A sample of sufficient size for statistical assessment has only been available with respect to Germany since 2000, so I will not provide the data for 1999 on the following.

The relationship between the book and market value in the given year *

		1999	2000	2001	2002
Brazil	Correlation	0.397		0.287**	
	N	69		76	
Finland	Correlation	0.542	0.559	0.637	0.779
	N	64	115	119	110
Germany	Correlation	n.a.	0.946	0.948	0.924
	N	–	83	172	145
Hungary	Correlation	0.854	0.905	0.996	0.987
	N	11	12	16	16
Sweden	Correlation	0.651	0.741	0.815	0.865
	N	51	83	102	100
Turkey	Correlation	0.823	0.869	0.861	0.811
	N	67	112	130	148
USA	Correlation	0.688	0.731	0.799	0.833
	N	3014	3014	3014	3014

*Significant ratios only. Ratios without mark are at least at 0.01 level significant. (2-tailed). ** Significant at least at 0.05 level (2-tailed).

Table 20

The data of the two tables *confirm hypothesis H1:* both in the entire sample and with respect to the selected countries, the expected strong relationship between accounting valuation and market value exists. The only problematic country here is Brazil: the relationship here – although its direction is line with the expectations – is weak, what is more, it was not even significant in two years. This is most probably due to the Argentinean crisis: the analysis of the Hungarian Ministry of Foreign Affairs (Ministry of Foreign Affairs of the Republic of Hungary, 2003) shows that its effect had only been eliminated by the end of 2002, with economic prospects greatly influenced by the presidential elections in 2002, and the national currency was devaluated by 35 percent against the US dollar. The result of the examination was also distorted by the high annual inflation of 5.5-11.3 percent in the period in question.

Notably, the relationship grew stronger in the assessed period in most cases, but the difference in order of magnitude was nonetheless substantial: the data suggest that the relationship is by far stronger in the case of Germany and Hungary than with respect to Finnish companies.

6.5.2. H2, H3 – the difference between and changes of the business and the book values

In an effort to verify the second and third hypotheses, I computed the quotient of the market and book values of the firms in the sample, both regarding the total of items and the selected countries (Tables 21 and 22). The quotient decreased in the assessed period, but it is remarkable that in 2002, accounting reports still showed only 35.22 percent of the value of the firms in the sample. (In 1999, this value was below 24 percent!) Chart 8 shows regional distribution in 2002. High rates are more common in the United States (US) than in the rest of the regions (Eastern Europe: EEU, Western Europe: WEU, South America: SAM), while there are by far fewer companies in the zone below 1.5, which means that the gap between the two values is much more common and much wider overseas.

The quotient of market value and book value (MV/BV) in the entire sample

	N	Average	Std. dev.	Minimum	Maximum	Skewness	Kurtosis
1999	3290	**4.1833**	10.9021	0.01	349.94	16.166	399.829
2000	3630	**4.0206**	15.4388	0.01	504.17	22.778	627.441
2001	3880	**3.2918**	12.0197	0.01	443.57	23.947	721.862
2002	3847	**2.8394**	11.8222	0.06	417.57	25.088	750.242
Common units	3045						

Table 21

The quotient of the market and the book values by region, in 2002 *
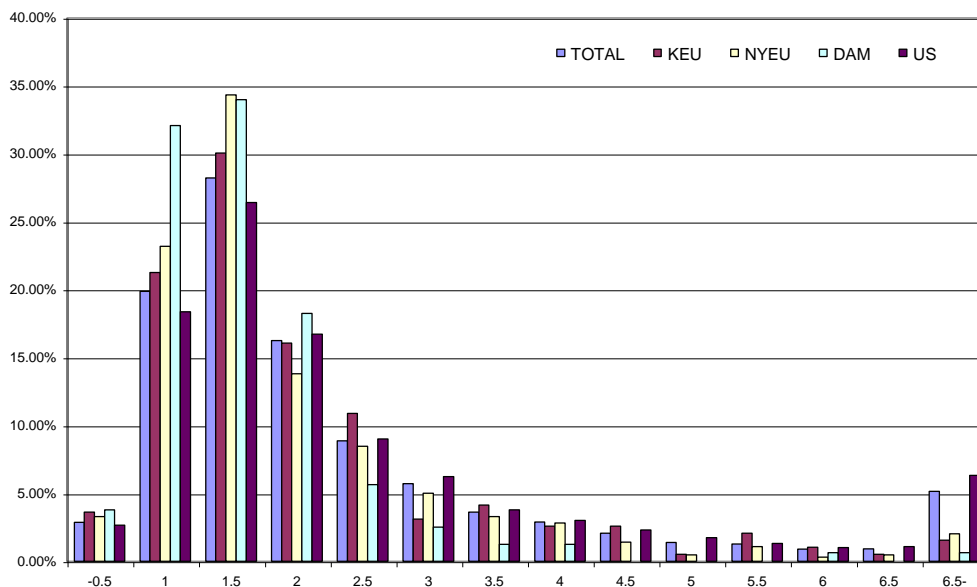
*The labels represent the upper value in the given category.

Chart 8

The quotient of market value and book value

	1999	2000	2001	2002

Brazil	**Average**	**1.6462**	**1.5231**	**1.3654**	**1.5104**
	Std. dev.	1.2882	1.0011	0.7070	2.1657
	N	68	74	76	83
Finland	**Average**	**5.9468**	**3.5237**	**2.2455**	**1.6607**
	Std. dev.	11.5007	5.6266	2.7435	0.9359
	N	64	115	118	110
Germany	**Average**	**–**	**5.2758**	**2.4693**	**1.6623**
	Std. dev.	–	5.2945	2.4235	1.8772
	N	–	83	171	145
Hungary	**Average**	**2.5547**	**1.2972**	**1.0683**	**0.9789**
	Std. dev.	3.2225	0.5786	0.4280	0.4056
	N	12	13	17	17
Sweden	**Average**	**4.6225**	**3.5070**	**2.4340**	**1.9206**
	Std. dev.	5.6316	3.7327	2.1473	1.4444
	N	51	83	102	100
Turkey	**Average**	**6.6229**	**3.3028**	**3.4608**	**2.0772**
	Std. dev.	8.3290	3.5335	4.9103	2.0933
	N	72	112	129	148
USA	**Average**	**4.2489**	**4.2432**	**3.5978**	**3.0743**
	Std. dev.	11.4400	17.2185	13.8966	11.2558
	N	2846	2876	2851	2856

Table 22

A more detailed analysis of the results would require the examination of the relationship between the increasing of the MV/BV rate and the GDP or the changes to the relevant share indices. Since the scope of this assessment only covers four years, time series analysis was not feasible.

The results confirm hypothesis H2: according to the T-test performed to verify H2a: MV/BV=1, the hypothesis is to be rejected in each year (Appendix 1). The T-test performed for the selected companies shows that it is only Hungary where the null-hypothesis cannot be rejected. (Appendix 2) This is due in part to the low number of sample items and the permanently poor performance of the stock exchange. The latter is caused by the combined effect of the Russian crisis, the slowing of EU economy, the elections of 2002 and the burst of the American dotcom bubble.

The results make it evident that the rate of the market and book values is decreasing with respect to the assessed period: i.e. the gap between the two values has narrowed. The T-test conducted to verify hypothesis H3 (Appendix 3) also suggested that the quotients calculated in 1999 and 2002 significantly differed with respect to the entire sample. The trend is the

opposite in Brazil, where the end of the Argentinean crisis brought about 2002 a stock exchange boom.

The ratio of the MV and BV indicators has reduced. According to the theoretical assumptions, this may be due to two reasons: either accounting-based measurement has grown more accurate or the external factors causing the difference between the results of the two types of assessment have changed. In the first case, I should have found major accounting reforms, but such were not introduced in the assessed period either in Europe or in the United States. More accurate measurement could also be argued on the basis that it was not rules but their application that had improved (due to better auditor or authority inspections, for instance). In an effort to clarify this point, I also assessed the relationship between the annual changes in the two indicators. (Table 23)

Relationship between the periodical changes in the MV and a BV indicators

	Correlation	Significance
1999-2000	0.088	0.000
2000-2001	0.511	0.000
2001-2002	0.003	0.860

Table 23

The numbers clearly show that up to 2001, the correlation of changes did strengthen, but even then only a rather weak connection had developed, that is, the increasing of market value was far from being accompanied in all cases by a rise in book value or *vice versa*, and indeed, no relationship whatsoever could be evidenced from 2001 to 2002. The changes of accounting value therefore could not serve as the basis to forecast the same for the value of the firm!

The above fundamentally question the appropriateness of the measurement technique and verify that the closing of the results of the two assessment systems was due to the changes in the external sources of the gap. The results therefore ***do not support hypothesis H3***: the gap between the book and market values did not grow but significantly decrease, which – following the same logic as previously – is to be credited to altered market conditions. The slower growth of the global economy, the political and macroeconomic problems of the United States, the tumbling of dotcom company prices and the Russian crisis are just a few examples of the factors that might have reduced the market value of companies, while accounting value followed a completely independent trend. (The direct inspection of the causes is not feasible due to the shortness of the timeline.)

The examination of the relationship between MV and BV in each country also shows interesting results. (Table 24) It is apparent from the assessment of the data that the closeness of the relationship is in most case rather volatile, medium at best, usually weak. This means that browsing accounting reports could hardly have helped small investors get a realistic picture of the situation of all assets of the company.

The relationship between the changes in the book and market values *

		1999/2000	2000/2001	2001/2002
Brazil	Correlation	0.549	0.712	0.331
	N	66	66	68
Finland	Correlation	0.301**	0.356	0.445
	N	64	115	110
Germany	Correlation	–	0.338	0.292
	N	–	83	145
Hungary	Correlation		Not significant	
	N			
Sweden	Correlation	0.569	0.568	0.587
	N	49	83	100
Turkey	Correlation	-0.504	0.213	Not sig.
	N	67	110	
USA	Correlation	0.088	0.511	Not sig.
	N	3000	3006	

*Significant ratios only. Ratios without mark are at least at 0.01 level significant. (2-tailed). ** Significant at least at 0.05 level (2-tailed).

Table 24

Hungary is a special case: not only was it impossible to show significant relationship in any one case, but the relationship even turned negative from 1999 to 2000 (-0.443, significance: 0.2). This means that in the past four years, analysing balance sheets did not offer any information concerning the market value of the firm whatsoever. Turkey shows a similarly bad picture: the changes in 2000 resulted in significantly <u>negative</u> relationships at all levels, that is, it was the companies whose accounted value grew that lost some of their market value.

The example of the United States is rather thought-provoking: despite the large number of items, the significant relationship evidenced from 1999 to 2000 practically meant independence, while not even a significant relationship could be shown in 2001/2002.

Several valuable lessons can be drawn from the comparison of the findings of the verification of H1 and H3: while the relationship between the absolute market and book values was strong in all countries, the relationship of their changes between 1999 and 2002 is

weak at best. This should lead us to conclude that the close connection of absolute values is the result of previous years and decades, but the capability of accounting-based measurement to estimate business value has been worsening in recent years continuously all around the world.

This conclusion can be confirmed through the analysis of a long time series. The trends in the absolute MV/BV rates or the closeness of the relationship between ΔBV and ΔMV could both be assessed. However, this would require not only that the data of the same companies be available for several past decades, but also that market efficiency remain unchanged and unaffected by tendentious effects (bubbles and crises).

6.5.2. H4 – the effect of the balance sheet structure

The effect of the relative amount of particular balance sheet lines on the quotient of the business and book values cannot be examined directly, since the total of proportionate shares for each line is one. Thus, the proportions cannot be considered as independent variables, and as a result can only be used in examinations where the entire balance sheet structure is handled as an integral unit.

Therefore, I assessed the effect of the balance sheet structure by creating groups (clusters) of the companies whose MV/BV quotient was similar. Then, I examined whether belonging to a certain cluster would explain the different balance sheet structure. (The variables used for the examination of the effects of the balance sheet structure are listed in Appendix 4.)

6.5.2.1. Tests on the entire sample

In the course of the grouping, I removed the countries whose MV/BV rate exceeded 10 in order to prevent outliers from distorting the clusters. I divided the remaining 3,563 items into four groups. (Table 25) In the first three groups, the MV/BV quotient dropped significantly, while cluster #4 comprises of the companies whose rate grew.

Description of the clusters of the entire sample

	1	2	3	4
MV/BV 2001	1.36	3.73	7.21	2.70
MV/BV 2002	1.30	2.24	5.02	4.92
N	2552	575	197	239

Table 25

Belonging to a certain cluster (i.e. a recognisable pattern in the changing of the MV/BV rate) explains very well the changes in the indicator computed on the basis of the balance sheet and the ratio of the market value and the book value of the equity in the entire sample. (The most important elements of the Anova table are listed in Appendix 5, while the values of the characteristics by cluster are in Appendix 6.)

The difference in the balance structure of the companies in clusters 1 and 3 suggests in all four years that the gap between the market and the book values is bigger in the case of the companies that have proportionally (1) higher cash-type asset value, (2) fewer tangible assets, (3) more equity and (4) less long-term loans. This is in perfect harmony with the theory, since accounting measurement is less distorted in the case of tangible assets and credits than in the case of equity and intangible assets. The higher cash reserve means better operating safety (less risk) or a more attractive purchase target (premium price), which in turn may lead to higher share prices. The group with an increasing MV/BV rate has not striking characteristics with respect to the structure of the balance sheet, which suggests that in the case of these companies, it was the effect of the factors not assessed by accounting that contributed to the increase.

I prepared linear regression models to help assess the significance of the identified differences, including balance structure indicators (the models only comprise the variables that do not correlate). The examination was conducted on the entire sample, concerning 2002, the explained variable was the quotient of the market value and book value for the given year. The results of the calculation are listed in Appendix 7.

The results confirm several aspects of the predictions of the theory. The models show that the MV/BV ratio of companies with a higher cash holdings and a higher share of intangible assets exceeds that of the firms that have a significant indebtedness rate or a higher share of invested capital. It is to be pointed out, however, that the included accounting indicators provide only very poor explanation for the MV/BV indicator, that is, the balance structure in itself is not sufficient to account for the difference between the market and book values.

6.5.2.2. Tests on subsamples

The results of the above calculations may have significantly been distorted by the structure of the sample, especially the dominant share of the United States. (Thus an American characteristic could be identified as a universal rule.) Therefore I also examined the explanatory ability of the balance sheet structure separately for a few countries.

The United States

The results of cluster analysis carried out on the basis of the data from 2001 and 2002 were similar to those of the tests on the entire sample. (Appendix 8) Companies with a higher MV/BV indicator operate with a higher proportion of cash and less invested and tangibles assets, at a smaller equity ratio. There is, however, no linear relationship between the share of foreign capital and the MV/BV indicator, and – unlike in the case of the entire sample – the companies with a wider gap between the values had a lower share of intangible assets.

Even in the apparently most effective capital market of the world we can not use the balance sheet analysis with significantly better results in the estimation of the value of the firm. Models relying on estimated regression only have a negligible explanatory capacity, but they do underline importance of lower invested capital. (Appendix 9)

Germany

Although cluster analysis identified more than one groups for interpretation using the MV/BV quotients for 2001 and 2002, they could not be separated significantly along any balance sheet structure indicator. This suggests that due to the substantially more restrictive accounting system, accounting reports are inseparable from market value to a much greater extent than in the case of the flexible system applied in the United States (GAAP).

Linear regression is, albeit stronger than overseas, still has minimal explanatory ability. There were only two variables that seemed worth including: the lower proportion of equity and less utilised capital (the total of equity and long-term loans) seem to increase the

difference between the results calculated on the basis of the two different valuation approaches.

Turkey

The cluster analysis in Turkey (Appendix 11) suggested that companies with a smaller equity share have a higher MV/BV quotient, while in the case of the two groups with the most significant value differences, the proportion of intangible assets is also higher.

Linear regression (Appendix 12) has more explanatory power than in Germany, but it still only gives a meagre R^2 indicator in total. Regression is only based on the proportion of equity and long-term credit: the data from 2002 suggest hat an increase in either of these figures reduces the MV/BV rate.

Hungary

The analysis of the few Hungarian companies in the sample (Appendixs 13 and 14) suggests that the MV/BV quotient of domestic firms increases parallel to the dropping of the equity share, but unlike previous subsamples, a higher proportion of cash is linked to a lower rate. Linear regression offers an unusually accurate estimate; its explanatory capacity is medium (R^2=43.2 percent), but it is based solely on the lower proportion of equity.

The examinations carried out on subsamples showed no significant difference to the tests conducted on the entire sample. The lower proportion of equity appeared in all clusters with a higher MV/BV rate, and linear regression showed in all cases that accounting data can be used to estimate the market value of the firm to a very limited extent. ***This confirms hypothesis H4***: the majority of the balance sheet structure indicators assessed was not at all related to the MV/BV quotient, and even those that are linked thereto offered very weak explanation for the evolution of the ratio.

6.5.3. H5, H8, H9 – Specific effects beyond the accounting system

As shown by the examination discussed in Sections 6.5.2.1. and 6.5.2.2., a relationship existing between a balance sheet structure that could be assessed as a whole and the MV/BV ratio is very faint, if any. Therefore I checked whether there were any companies with similar balance sheet structures, and verified if the resemblance can be the result of some underlying variable.

I generated factors from the structural indicators of the balance sheets of 2002, then created six clusters using the 3 factors identified. The results of the assessment help verify hypotheses H4 and H5 at the same time. The generated groups explain not only the differences of the MV/BV indicator in 1999, 2000 and 2001, but also the values of the structural balance sheet indicators from the previous years. (Appendix 15)

Cluster averages*

Cluster	1	2	3	4	5	6	Átlag
Cash/assets 2002	7.81%	11.72%	**29.79%**	5.08%	9.35%	5.64%	13.01%
Equity/total liabilities 2002	**53.01%**	**56.05%**	**74.01%**	45.01%	44.97%	34.82%	51.17%
Long term debt/ total liabilities 2002	14.72%	11.94%	1.64%	**24.36%**	13.24%	**28.36%**	15.32%
Tangible assets/assets 2002	**65.31%**	**40.15%**	15.96%	**61.02%**	22.23%	15.85%	29.52%
Fixed assets/assets 2002	8.59%	19.77%	15.26%	**63.15%**	22.95%	15.38%	28.59%
Intangible assets/assets 2002	5.32%	12.39%	9.74%	7.59%	**17.56%**	**42.82%**	17.24%
Invested assets/assets 2002	**62.74%**	**22.47%**	0.91%	1.10%	1.07%	0.86%	2.45%
MV/BV 1999**	2.9722	**5.2957**	**5.7859**	2.1080	3.0191	3.7007	3.7364
MV/BV 2000**	**4.3851**	**4.2670**	**4.5744**	2.0190	2.8467	2.9980	3.2025
MV/BV 2001**	**3.2439**	**2.9991**	**4.1979**	1.7680	2.5288	2.3591	2.7717
MV/BV 2002**	**2.6989**	2.2016	**2.8169**	1.7466	**2.7065**	**2.7086**	2.4949

*Values above the average are marked in bold. **Variables not included in cluster building.
Table 26

Having revised the groups, it is evident that a common order of succession exists with respect to various indicators among groups in the entire assessed period. Thus, the data of these four years suggest that a higher proportion of tangible assets and an average equity (Cluster 1 and Cluster 2) contributed to an MV/BV quotient above the average in 2000 and 2001, but assessing these two groups also cast light on the fact that despite their shared characteristics regarding the structure of the balance sheet, Group 1 was above average in 2002, Group 2 in 1999, and they were below and above average, respectively, at the other end of the assessed period. **This suggests that in the case of these two groups, the MV/BV rate was affected by characteristics ignored by accounting.**

The third cluster shows that a very high proportion of cash and equity will result in an MV/BV quotient permanently above market average. The fourth cluster included companies in which the share of credits and invested assets is high, and the results got with the two types of measurement are closer to each other than the average. The fifth cluster shows that the MV/BV rate will rise above average if the proportion of intangible assets is also above average, while the companies in the sixth group have extremely high intangible asset shares (nearly 43 percent!) and a credit share above average, and their MV/BV quotient also exceeded the average. It is to be noted, however, that the latter two groups were permanently below the average with respect to the value quotient, and only managed to exceed the third cluster in 2002. This again suggests that market valuation changed without the implementation of any modifications to the structure of the balance sheet, which means that other effects, excluded from the scope of accounting also contribute to the definition of market value. On this basis, **hypothesis H5 cannot be rejected**, on the contrary: the results suggest that the characteristics of the structure of the balance sheet are not appropriate to base conclusions on regarding market value, since other effects, not assessed in the scope of accounting, also have a major impact thereon.

In order to identify these company-specific effects, I examined what other factors could explain the characteristics of various clusters. According to hypotheses H8 and H9, there may be industry-related, regional or country-specific effects in action.

6.5.3.1. Industrial effects

I set up a cross-table to examine industrial effects. In this, I verified if belonging to a certain cluster created on the basis of the structure of the balance sheet and the branch of industry the company operates in were related. This will answer whether the (rather limited) relationship between the balance sheet structural indicators and the MV/BV ratio is caused in part by the fact that the technological characteristics of the industry in question affect the balance sheet.

All statistical indicator generated on the basis of the cross-table suggest that there is strong relationship between belonging to a particular cluster and certain industries. (Table 27, Appendix 16). Thus, it has been established that the branch of industry a company belongs to fundamentally influences the structure of its balance sheet, which means that the individual

examination of the latter will not make it possible to assess the difference between the two valuation approaches. (That is, it is likely that the conclusions drawn earlier along the lines of balance sheet structure can be more easily connected to particular industries.) This relationship also draws attention to the fact that the structure of the balance sheet in itself will not help assess the operations of the company in question, since the ratios common in the given branch of industry also need to be known.

Industry-cluster cross-table*

Industry	1	2	3	4	5	6	Total	N
Retail	0.00%	2.21%	22.12%	**34.07%**	**32.30%**	9.29%	100%	226
Telecommunications	0.49%	**8.25%**	**29.61%**	**23.30%**	26.70%	11.65%	100%	206
Healthcare-products	0.52%	1.55%	**51.81%**	3.63%	**30.05%**	12.44%	100%	193
Commercial Services	**1.60%**	2.66%	20.21%	**16.49%**	**32.98%**	**26.06%**	100%	188
Computers	0.00%	**5.06%**	**39.33%**	1.12%	**36.52%**	**17.98%**	100%	178
Software	0.00%	**6.78%**	**45.76%**	0.56%	25.99%	**20.90%**	100%	177
Electronics	0.00%	2.94%	**40.00%**	7.65%	**31.76%**	**17.65%**	100%	170
Pharmaceuticals	**1.36%**	**5.44%**	**51.02%**	4.08%	27.89%	10.20%	100%	147
Oil & Gas	0.00%	2.48%	5.79%	**84.30%**	6.61%	0.83%	100%	121
Food	**0.93%**	3.70%	13.89%	**32.41%**	**35.19%**	13.89%	100%	108
Semiconductors	**0.93%**	**13.08%**	**44.86%**	13.08%	18.69%	9.35%	100%	107
Electrical equipment	**2.00%**	**6.00%**	2.00%	**45.00%**	**37.00%**	8.00%	100%	100
Total subsample	**0.70%**	**4.78%**	**25.19%**	**22.64%**	**29.91%**	**16.78%**	**100%**	**3724**

*For industries of at least 100 member firms. Values above the average are marked in bold.

Table 27

Table 27 shows the subsample of the 12 largest branches of industry out of the 63 in the sample, which constitute 51.58 percent of the items in total. Companies with a high proportion of invested assets (Clusters 1, 2 and 4) are mainly active in commerce, telecommunication, the oil and gas industries and electrical equipment building. In the industries that require above-average R&D activities, however, (telecoms, healthcare products and pharmaceuticals, information technology and electronics) – probably due to the higher operating risk – firms with high cash holdings (Cluster 3) that are funded primarily from equity (Clusters 1, 2 and 3) are more common. The typical company in Clusters 5 and 6 that both have an outstanding proportion of intangible assets is most likely active in knowledge-heavy industries, or in branches requiring brand names and exclusive contracts, like commerce or food industry.

The MV/BV ratio in the largest branches of industry*

Industry	1999	2000	2001	2002
Software	6.22	6.53	4.36	4.55
Pharmaceuticals	7.88	6.40	9.65	3.96
Healthcare-products	4.57	5.26	6.24	3.56
Telecommunications	5.96	5.21	3.55	3.36
Total sample	**4.18**	**4.02**	**3.29**	**2.84**
Computers	7.76	9.89	4.42	2.67
Commercial Services	3.61	3.01	2.99	2.65
Electronics	3.82	3.46	5.02	2.41
Food	4.19	2.84	3.62	2.10
Retail	3.00	2.29	2.22	2.05
Oil & Gas	1.66	1.90	1.58	1.51

*In order of the averages in 2002

Table 28

The results will be similar if we assess solely the value of the MV/BV ratio by industry. (Table 28) The data show that knowledge-heavy sectors consistently tend to have a rate higher than the average. (Only computer manufacturing was a bit below average in 2002.) The market value of the companies in industries that have little added value and require substantial invested assets such as commerce or the oil and gas industry is much closer to the value suggested by accounting. This is in line with the fact that the bases of current-day accounting were laid down to fit the measurement criteria of such capital-heavy activities in the last century.

6.5.3.2. Regional and country-specific effects

Companies may be significantly influenced by their macroenvironment. In an effort to verify this, I grouped the countries specified as the primary place of activities of the companies into regions. In addition to the United States (US), I considered South America (SAM), Western Europe (WEU) and Eastern Europe (EEU), the latter also including Central European countries that are not members of the EU, and Turkey.

The cross-table examination showed that the probability of belonging to as certain cluster was related to the geographical region of activities. Statistical tests confirm that distribution cannot be considered as identical at any level. (Table 29, Appendix 17). Although clusters 3, 4 and 5 are the largest in all regions, Clusters 1 and 2 seem to be Eastern European characteristics, while Western Europe and the United States are overrepresented in Cluster 6, which is practically non-existent in the EEU region. In South America, on the other hand,

Clusters 1 and 2 are almost empty, with an overwhelming majority of companies belonging to Cluster 4.

Probability of belonging to a certain cluster *

Region	Clusters 1	2	3	4	5	6	Total
DAM	**1.12%**	1.69%	10.67%	**57.30%**	23.60%	5.62%	100.00%
KEU	**4.15%**	**13.47%**	**26.42%**	**33.16%**	21.76%	1.04%	100.00%
NYEU	0.34%	**5.46%**	21.33%	21.67%	**36.69%**	14.51%	100.00%
US	0.51%	4.23%	**26.85%**	19.88%	29.45%	**19.08%**	100.00%
Total	**0.70%**	**4.78%**	**25.19%**	**22.64%**	**29.91%**	**16.78%**	**100.00%**

* Values above the average are marked in bold.

Table 29

The above show that there are a large number of companies in our region that have a high MV/BV ratio despite their high proportion of equity and tangible assets and relatively low current assets. Out of these presumably large producing companies, however, there are both examples of successful value generation (Cluster 1) and even more examples of failure in this field (Cluster 2). The typical company in the assessed South American countries (Cluster 4) is highly indebted, and the majority of its assets are made up by tangible and fixed assets, most of which are non-financial invested assets, and their market value is decreasing.

In Western Europe, in addition to unsuccessful large producing companies (Cluster 2), there is an unexpected high number of presumably knowledge-based organisations that operate with a big proportion of intangible assets (Cluster 5) that managed to improve their MV/BV quotient by 2002 despite the general crisis. In the United States, the most significant group is Cluster 6: these companies have a high share of credits and operate with more intangible assets than even their Western European counterparts, and are thus highly successful. (It is easily possible that the difference is in part due to the differences between the regulations of the IFRS and the GAAP regarding the accounting of intangible assets.) It is worth examining Cluster 3, which is common both in the United States and Eastern Europe. These companies are only lightly indebted and have high cash holdings. Although their MV/BV ratio is high, it is constantly decreasing. This may suggest that the high quotient is caused by the exclusion of a factor judged valuable by the market from the accounting reports (i.e. BV is small and not MV is large), but the market value of these companies is constantly dropping due to the value loss meant by unutilised cash.

Probability of belonging to the given cluster*

Country	1	2	3	4	5	6	Total	N
USA	0.51%	4.23%	**26.85%**	19.88%	29.45%	**19.08%**	100.00%	2767
Turkey	**5.41%**	**15.54%**	**27.70%**	**26.35%**	23.65%	1.35%	100.00%	148
Germany	**0.72%**	**5.76%**	**30.94%**	5.04%	**41.73%**	15.83%	100.00%	139
Brazil	**1.96%**	2.94%	10.78%	**45.10%**	**32.35%**	6.86%	100.00%	102
Finland	0.00%	3.92%	17.65%	**34.31%**	**39.22%**	4.90%	100.00%	102
Sweden	**1.14%**	3.41%	18.18%	13.64%	**42.05%**	**21.59%**	100.00%	88
Hungary	0.00%	**5.88%**	23.53%	**64.71%**	5.88%	0.00%	100.00%	17
Total	**0.70%**	**4.78%**	**25.19%**	**22.64%**	**29.91%**	**16.78%**	**100.00%**	**3724**

* Values above the average are marked in bold.
Table 30

Similarly to regions, the relationship between belonging to a certain cluster and the country specified as the primary area of operations is strong (Appendix 18, Table 30). It is evident from Table 30, which comprises 90 percent of the data, that while the most common group in the United States is that of companies with high cash holdings and equity (Cluster 3) and firms with a high share of intangible assets (Cluster 6), Brazil is characterised by more indebted companies with a high rate of invested assets (Cluster 4) and businesses with moderate intangible assets (Cluster 5). The majority of Swedish companies operate with substantial intangible assets (Clusters 5 and 6), while the sample items from Hungary have significant invested assets (Clusters 2 and 4), the majority of which also relies on credits (Cluster 4).

6.5.3.3. Parallel examinations

The results of the above examinations show that belonging to a certain cluster that explains the MV/BV of the company in question is also affected by its field of activities and location. It is difficult to separate regional, country-specific and industrial effects: certain branches of industry are more popular in particular regions – e.g. due to comparative advantages, thus there is a relationship between industrial and geographical categories. In an effort to assess these two effects simultaneously and to filter out interlocking, I used dummy variables and fitted a linear regression on the natural logarithm of the MV/BV rates found. I included four regions, the 8 countries defied earlier and the 13 largest industries (with an item number of at least 100). In addition, five dummy variables show belonging to a certain cluster. (Appendix 19, Table 31) When interpreting these data, it is to be considered that we

assume when applying this method that particular regions and countries affect all industries to the same extent, and that belonging to a certain branch of industry has the same impact in all regions.

Models with the highest explanatory power*

	1999	2000	2001	2002		1999	2000	2001	2002
R²	**19.75%**	**17.49%**	**14.42%**	**11.20%**	Biotechnology	1.325	1.211	0.880	0.746
Constant	0.951	0.882	0.856	0.967	Electrical equip.				-0.201
KLA2	-0.355	-0.283	-0.296	-0.492	Electronics		0.230		
KLA3	-0.327	-0.375	-0.329	-0.524	Food				0.152
KLA4	-0.609	-0.542	-0.511	-0.589	Healthcare-serv.	0.427	0.604	0.598	0.431
KLA5	-0.487	-0.468	-0.413	-0.455	Semiconductors	0.666	0.660	0.249	-0.178
KLA6	-0.380	-0.430	-0.391	-0.499	Pharmaceuticals	0.778	0.758	0.835	0.576
Suth Am.	-0.265	-0.242	-0.220	-0.220	Commercial serv.	0.210		0.140	0.218
Eastren Eu.		-0.391	-0.436		Retail	0.147			
Western Eu.		0.126		-0.117	Computers	0.713	0.569	0.312	
Hungary				-0.618	Software	0.806	0.626	0.448	0.286
Germany		0.314		-0.258	Telecom.	0.560	0.533	0.291	
Norweg				-0.246					
Sweden	0.385								
Turkey	0.740	0.812	0.817						

*The model explains the natural logarithm of the MV/BV ratio of the given
Table 31

Due to the coding of dummy variables, the constant of the model gives an estimate of the natural logarithm of the MV/BV ratio of the US-based companies in Cluster 1 in the industries that have not been assessed separately. Although the estimated models have only moderate (11-20 percent) and decreasing explanatory ability, the results are still very important for three reasons.

(1) The assessments confirm the assumption that accounting does not measure all factors relevant with respect to the value of the firm. (H5) (Although significantly different clusters can be created on the basis of data concerning the structure of the balance sheets that also explain well the differences in the rest of the included factors, the distribution of the total of the items cannot be grasped solely through balance data.)

(2) Since in the best estimation model for each year, not only the variables that suggest belonging to a particular cluster created on the basis of balance structure characteristics is significant but also the dummy indicator of at least one geographical region, country or industry, the hypothesis claiming that variables are independent must be rejected on the basis of statistics, that is, *the results confirm hypotheses H8 and H9* that state these factors are

important simultaneously. (It cannot be confirmed that the statistically significant differences between the groups created along the lines of industry or country are caused by a single factor.)

(3) It is the very weakness of the explanatory ability that draws attention to the fact that balance sheet the geographical location or the branch of industry *in itself* does not determine the value of the firm, since a number of other significant factors (such as strategy) also contribute thereto.

Of course, several conclusions can be made in addition to the above. (I also present the exponential values of coefficients in Table 13 to ease interpretation.) In the assessed periods, South American and Eastern European companies were underestimated in comparison with the companies of the United States – presumably due to the lower investor attention directed at them, worse performance prospects and regional risks. (It is highly likely that the national accounting regulations of the regions are not closer to the principle of market valuation than the GAAP.) Turkey, however, stood out in the eastern block: its national average was 150-200 percent higher than the constant.

On the other hand, Western Europe performed better in 2000 but worse in 2002. This effect was further enhanced by the unique volatility of the German economy which is considered the bellwether of the economy of entire EU: in the better years they did perform above average, but in 2002 the results fell below the figures calculated elsewhere. (On the basis of the two effects, the MV/BV ratios of the companies in the model started from 3.75 and 1.81, regardless of industry, rather than from the constant ratios of 2.42 and 2.63, respectively.)

The exponential (e^x) coefficients of the models with the largest explanatory power*

	1999	2000	2001	2002		1999	2000	2001	2002
Constant	2.59	2.42	2.35	2.63	Biotechnology	3.76	3.36	2.41	2.11
KLA2	0.70	0.75	0.74	0.61	Electrical equip.				0.82
KLA3	0.72	0.69	0.72	0.59	Electronics		1.26		
KLA4	0.54	0.58	0.60	0.55	Food				1.16
KLA5	0.61	0.63	0.66	0.63	Healthcare-serv.	1.53	1.83	1.82	1.54
KLA6	0.68	0.65	0.68	0.61	Semiconductors	1.95	1.93	1.28	0.84
South Am.	0.77	0.79	0.80	0.80	Pharmaceuticals	2.18	2.13	2.30	1.78
Eastern Eu.		0.68	0.65		Commercial serv.	1.23		1.15	1.24
Western Eu.		1.13		0.89	Retail	1.16			
Hungary				0.54	Computers	2.04	1.77	1.37	
Germany		1.37		0.77	Software	2.24	1.87	1.57	1.33
Norway				0.78	Telecom.	1.75	1.70	1.34	
Sweden	1.47								
Turkey	2.10	2.25	2.26						

*The estimation of MV/BV ratio is calculated by multiplying the given coefficients!

Table 32

The analysis of cluster coefficients also casts light on the fact that having removed regional and industrial influences, only the fourth and fifth groups could keep their positions in comparison with Cluster 1 (the shoe value of which is on the rise), while the third cluster showed a dramatic drop. This suggests that whatever factor caused the fallback up to 2001, it was not linked to the characteristics of these industries, i.e. the high rate of credit (Cluster 4), and moderate intangible assets (Cluster 5). Considering the differences between clusters, it appears that lower long-term investments (Cluster 2), high cash reserves and equity rate (Cluster 3) and the very high proportion of intangible assets (Cluster 6) in themselves were valued less by the market than previously.

It must not be forgotten, however, that the measurement might have been distorted by two factors. Firstly, inflation affects the MV/BV ratio in various countries, and the situations of various capital markets may also differ. The latter does not only comprise trading trends but also macroeconomic processes that make it necessary to apply longitudinal examinations for accurate identification.

A revision of industrial coefficient also has interesting results: between 1999 and 2002, the performance of research-heavy sectors (biotechnology, telecommunications, pharmaceuticals, computer, software and semiconductor manufacturing) shrank, while traditional industries (commerce, food production) were more successful.

In total, therefore, *my results support hypotheses H5, H8 and H9*, since the both the region and country of operation and the given industry significantly explained the value of the MV/BV ratio. In addition, I found groups of companies that had similar balance sheet structures but their MV/BV ratios were very different.

6.5.4. H6 – The effect of inflation

According to the theory, inflation may cause significant differences between the market and book values of a particular asset, which may cause the MV/BV rate of the company to rise. This effect is only substantial and significant if the given asset is permanently included in the company books and inflation is high. (The difference in the value of current assets that are constantly revaluated by nature and of financial assets that are usually revised when preparing the balance sheet is normally hardly affected by inflation.)

In an effort to verify hypothesis H6, I re-estimated the linear regression applied in Section 6.5.3. (aimed at the assessment of hypotheses H5, H8 and H9) taking into account the inflation rate for the given year. (Country dummies were dropped from the model in order to prevent close correlation between variables.) The explanatory ability of inflation rate was not once significant with respect to the entire sample.

Then, I divided the base sample into two clusters along the proportion of tangible and fixed assets. (Appendix 20) In the case of the over one thousand companies in the first cluster, I estimated linear regression, and here – with the exception of 2002 – inflation proved a significantly explanatory factor. (Appendix 20, Table 33) The direction of the coefficient is also in line with the theory, since one point plus in the inflation rate increased the MV/BV quotient by 0.8-9 percent. Due to its nature, regression means that if inflation is one percent higher in a country than in another, the average MV/BV ratio was also 0.8-9 percent higher in the case of companies with a high share of tangible assets. The wide range of the coefficient values should be taken as a warning sign, however, the more than tenfold difference may be result of some underlying factor excluded from the models which had overall poor explanatory abilities.

The effect of inflation on the MV/BV ratio*

	1999	2000	2001	2002
Estimating power (R^2)	15.29%	19.36%	14.47%	9.50%
Coefficient of the annual inflation (X)	0.008000	0.086500	0.040300	-
e^X	1.008067	1.090372	1.041088	-
The effect of 1 percentage point increase in inflation	0.81%	9.04%	4.11%	-

*The liner regression explains the ln(MV/BV) value of the given year.

Table 33

On the basis of the assessment results therefore, ***hypothesis H6 cannot be rejected***. In the case of companies that had a higher share of assets sensitive to the effects of inflation, the rate of a price increase significantly explained the trend in the MV/BV quotient, with a coefficient that had the direction assumed by the theory. On the other hand, due to extreme coefficients and the effect of inflation reducing market value, further analyses will be required to describe the relationship in detail.

6.5.5. H7 – The factors explaining the volatility of the MV/BV ratio with time

According to hypothesis H7, the MV/BV quotient is more volatile at companies where the difference of the two values is mainly due to items that are connected to property components which cannot be sold easily. Such may include not marketable brand names and results of research and development, human resources and synergy. Thus, the hypothesis claims that the MV/BV ration of companies that operate in knowledge-heavy industries and use brands will be more volatile.

In order to verify this hypothesis, I computed the variance of the MV/BV rates of all companies with respect to the assessed period, then formed four clusters on the basis thereof. I used cross-tables to confirm the relationship between belonging to a certain cluster and the industry of operation (Appendix 21). The relationship was proven significant at all levels. In the analysis of the cross-table, it is worth giving a more detailed look to the industries that only appear in clusters with low distribution, and to which the companies with the highest degree of distribution belong. (Table 34)

Branches of industry by variance

Industries in which the elements of the cluster with the largest variance operate	Industries only present in the cluster with the lowest variance	
Beverages	Agriculture	Machinery-constr. & mining
Biotechnology	Airlines	Metal Fabricate/Hardware
Electrical equipment	Building materials	Miscellaneous Manufacturing
Electronics	Chemicals	Office Furnishings
Healthcare-products	Coal	Oil & Gas
Internet	Food Service	Oil & Gas Services
Media	Forest Products & Paper	Packaging & Containers
Pharmaceuticals	Gas	Pipelines
Semiconductors	Hand/Machine Tools	Real Estate
Software	Home Builders	Shipbuilding
Telecommunications	Household Products/Wares	Storage/Warehousing
	Housewares	Toys/Games/Hobbies
	Iron/Steel	Trucking & Leasing
	Lodging	Water

Table 34

In line with the hypothesis, the most significant variance was shown in the industries pursuing significant research and development activities and the industries relying heavily on brand names and intellectual products, while the MV/BV ratio of traditional branches of industry that require high invested assets is less likely to vary. An organisation of industries in sequence of average variance gives the same results (Table 35).

Industries with the highest and lowest average variance

	Industry	Average variance	N	Std. dev. of var.		Industry	Average variance	N	Std. dev. of var.
	Total average	**137.6455**	**3043**	**2492.0703**	:	:	:	:	:
1	Biotechnology	1605.6006	77	12606.2290	52	Lodging	0.6732	18	1.2339
2	Media	703.7003	37	2847.4549	53	Home Builders	0.4800	30	0.8573
3	Software	478.7256	145	4728.3355	54	Hand/Machine Tools	0.4218	22	0.6421
4	Apparel	378.8655	47	2579.3825		Machinery-constr. &			
5	Telecom.	348.7279	159	2992.3942	55	Mining	0.2881	5	0.3318
6	Internet	283.2523	50	931.0426		Forest Products			
7	Computers	263.0821	149	2342.4886	56	& Paper	0.2168	29	0.5080
	Miscellaneous				57	Packaging & Containers	0.1563	15	0.1906
8	manufacturing	262.7877	81	2348.7925	58	Water	0.1421	10	0.1527
9	Pharmaceuticals	84.5082	122	280.9969	59	Trucking & Leasing	0.1171	5	0.1877
10	Electronics	59.0927	148	352.1749	60	Shipbuilding	0.1136	1	.
11	Semiconductors	58.9071	92	219.2213	61	Gas	0.1103	22	0.1999
	Healthcare-				62	Real Estate	0.0630	6	0.0973
12	products	57.2722	171	258.7202	63	Coal	0.0541	1	.

Table 35

Table 36 includes the average values of the balance sheet indicator significantly explained by variance-based clusters. According to this, it holds true for each assessed year that

companies with a higher variance in the MV/BV ratio had a larger proportion of cash and equity, but less credit and invested assets

Considering changes with time, it became evident that Cluster 2 went through a minor strategic change in the assessed period, which was more significant in the case of Clusters 3 and 4, which in itself may be the reason behind the larger variance in the MV/BV ratio. In all of the three clusters that showed higher variance, the proportion of invested and tangible assets fell faster than the average, while intangible assets showed a significant increase. (Reaching 9.2 percent in the case of Cluster 3!) In addition, the companies in Clusters 3 and modified their strategies in the opposite direction: those in group 3 reduced while the members of group 4 increased their cash holdings, and while the equity share remained unchanged in Cluster 3 against am average increase of 10 percent, it rose in group 4 by 11 (!) percent. On the other hand, the companies in Cluster 3 increased their indebtedness ratio by 5 percent, while this value fell by 8 percent in Cluster 4.

Balance sheet structure averages of variance-based clusters (percent)

Cluster	1	2	3	4	Total sample	Cluster	1	2	3	4	Total sample
N	2676	179	74	39	2968	LBTOAS01	**18.90**	12.78	11.50	9.27	18.27
CATOAS99	9.08	**20.48**	**28.27**	**25.53**	10.37	TATOAS01	**30.91**	21.24	17.74	18.60	29.91
EQTOAS99	50.47	**57.53**	**58.24**	48.71	51.02	FXTOAS01	**30.77**	17.74	14.12	15.01	29.47
LBTOAS99	**19.21**	9.92	8.23	15.65	18.40	INTOAS01	**18.09**	16.38	**23.09**	14.64	18.07
TATOAS99	**31.73**	21.45	17.47	20.46	30.69	LITOAS01	2.11	**3.50**	**3.65**	**3.60**	2.24
FXTOAS99	**31.56**	18.13	15.29	16.49	30.25	CATOAS02	10.61	**21.93**	**26.06**	**31.40**	11.86
INTOAS99	**16.38**	13.38	13.65	9.99	16.07	EQTOAS02	51.24	**58.04**	**58.28**	**60.00**	51.89
CATOAS00	9.14	**22.14**	**31.21**	**31.97**	10.66	LBTOAS02	**18.29**	9.74	12.27	7.68	17.55
EQTOAS00	50.43	**57.52**	**59.64**	**64.26**	51.21	TATOAS02	**30.87**	19.81	16.04	17.24	29.74
LBTOAS00	**18.63**	10.70	9.86	4.43	17.81	FXTOAS02	**30.82**	15.85	13.61	12.86	29.37
TATOAS00	**30.76**	19.70	16.62	15.38	29.62	INTOAS02	17.45	**18.11**	**22.85**	13.21	17.57
FXTOAS00	**30.53**	16.25	13.29	13.06	29.13	LITOAS02	2.05	**3.96**	**2.46**	**4.40**	2.20
INTOAS00	**17.12**	14.37	15.69	10.18	16.84						
CATOAS01	9.95	**21.54**	**26.73**	**27.30**	11.20						
EQTOAS01	49.80	**53.72**	**55.61**	**53.66**	50.20						

(absolute value)

Cluster	1	2	3	4	Total sample
MVTOBV99	2.2467	**8.7452**	**12.7130**	**15.3228**	3.0151
MVTOBV00	2.0559	**6.9525**	**10.5362**	**14.0409**	2.6758
MVTOBV01	2.0086	**5.3159**	**6.9056**	**10.7253**	2.4149
MVTOBV02	1.8628	**4.1927**	**5.2737**	**4.5313**	2.1048

Table 36

This shows mostly that the companies with the most variable MV/BV quotient were the firms that substantially modified their funding structure, the share of cash reserves and the volume of utilised intangible assets. (The members of group 3 purchased intangible assets from credit, those in group 4 obtained equity for this purpose, and did not spend all the extra money.) As a result of the changes, the order of Clusters 3 and 4 with respect to the BV/MV ratio was altered.

In total therefore, *the results confirm hypothesis H7.* In the industries with a higher proportion of intangible assets, those which rely intensively on knowledge and brand names, the variance of the MV/BV ratio was higher in the assessed period, which means that it is substantially more characteristic of companies that generate more added company value that (1) forecasts concerning the value of the firm cannot be made on the basis of performances in previous years and (2) the accounting valuation system is even less effective than on average.

The most important conclusion is that (3) companies with a high MV/BV ratio do not form a homogeneous group. The assessment of the reasons and structure of the difference reveals whose market value shows more variability. i.e. which of these companies represent a

more risky investment. This is the reason why I found no obvious relationship between company beta values and the MV/BV rates. It is worth conducting further examinations to verify whether the relationship between the variability of the MV/BV ratio and company specific risk is close.

6.6. SUMMARY OF EMPIRIC RESULTS

The majority of the examination results confirmed the picture outlined on the basis of specialist literature. The findings of the verification of various hypotheses are summed up in Table 37.

Overview of examinations

Hypothesis	Examination	Result	
H1: There is a positive relationship between the book and business values of companies.	Analysis of correlation	Strong positive relationship both in the entire sample and the selected countries.	√
H2: There is significant difference between the book and business values of companies.	Descriptive statistics	Significant difference everywhere (except for Hungary).	√
H3. The difference between the book and business values of companies has increased in recent years.	Descriptive statistics	Significant decrease in the MV/BV ratio in the assessed years – due to macroeconomic factors.	X
H4. The structure of the balance sheet does not have a major impact on the ratio of the business and book values.	Regression, factor analysis, cluster analysis	The assessed balance sheet structure indicators explained the trends of the MV/BV ratio very poorly or not at all.	√
H5. The ratio of the business and book values is influenced by such company-specific items that are excluded from accounting statements.	Regression, factor analysis, cluster analysis	Conclusions regarding MV cannot be made on the structure of the balance sheet, since it is also greatly affected by factors not covered in accounting.	√
H6. Inflation has an effect on the gap between the business and the book values.	Regression, cluster analysis	The rate of price increase significantly explained the MV/BV rate at companies with many inflation-sensitive assets.	√
H7. The volatility in time of the business and book values is influenced by the structure of the group of variables explaining their difference.	Cluster analysis, descriptive statistics	In knowledge-intensive industries using brand names and a lot of intangible assets, the variance of the MV/BV ratio was higher in the assessed period.	√
H8. The gap between the business and book values is affected by industry characteristics, thus the rate will significantly differ in different sectors.	Cluster analysis, cross-tables, descriptive statistics, regressions	The appropriate industry, along with the country and region of operation significantly explained the MV/BV ratio.	√
H9. The MV/BV ratio is affected by firm- and region-specific factors, thus the rates in the same industry will vary from country to country.	Cluster analysis, cross-tables, descriptive statistics, regressions	Both the region and country of operation, along with the appropriate industry significantly explained the MV/BV ratio.	√

Table 37

The findings of the analysis show that albeit there is a close relation between the accounting value and the market value (H1), the difference is substantial, and the changes of the two indicators did not even correlate in recent years, which suggests that the relationship between the nominal values is most probably the result of the long shared trends in past decades. Although the ratio is obviously higher than one (H2), as a result of unfavourable economic trends, the difference between the two value significantly decreased in the assessed period (H3), but the difference is still nearly threefold.

It has been established that the balance sheet indicators included in the examination tell only very little of the company, the composition of the asset or liability side can therefore affect the MV/BV ration only to a limited extent (H4). There are, however, other factors excluded from the scope of accounting that do affect it (H5): inflation (H6) the industry in question (H8) and the main geographical area of the operations (H9) all significantly influenced the value of the indicator.

The research shows that the MV/BV ratio is especially high in the industries where companies require a high quantity of intangible assets, brand names, specialist knowledge and research and development. The quotient for these companies varies more than the average (H7), which is most likely due to the larger specific risk connected to these assets.

6.7. POSSIBLE UTILISATION OF THE RESULTS

Through the testing of the hypotheses I have shown the international importance of the items excluded from the balance sheet. The findings can be used in a wide range of fields.

(1) Research findings draw attention to the different approach of accounting and business valuation. Familiarity with the significance of this difference will help the valuation of a particular company by adding a much wider range of information base than pure accounting data. The theoretical material presented shows how an asset-based company valuation can be made more accurate than was in the case of traditional balance-based methods. By introducing the concept of the added value of the firm, it also points out that an asset-based approach will be different from the results calculated using income-based methods, and this is justified from a business point of view, although it does not necessarily mean that accounting is erroneous.

(2) The examinations also help understand the factors which are the root of the difference. This way, after familiarising with the unique characteristics of the operation of a given company, we will be able to concentrate on the most significant factors of distortion in the analyses, and the discussed theoretical background will also provide the methodology most suitable for the correction needed. The comparison of diverse theoretical approaches casts light on the diversity of possible approaches and reminds that it would be a serious mistake to valuate an asset with reference only to a single method. The comparison also helps identify the strengths and weaknesses of theses methods.

(3) It is an important conclusion that the items excluded from the balance sheet can be divided into two clearly separate groups (hard and soft assets), which represent different extents of risk. This revelation serves as a hint in the case of asset-based valuation regarding the risk underlying company value and the profit reasonably expected by investors. The discussed methods can thus be used also as a sort of control tool, supplementing income-based or other valuations (such as those based on multipliers and market comparison). The compiled methods will make it easier to explore the reality of explicit or implicit assumptions used in other methods.

(4) The grouping of assets and their recording at a certain value can help set up company performance measuring and controlling systems in a more accurate form that is tailored to the characteristics of the firm, thus enabling performance tracking and more effective decision-making.

(5) The information provided by accounting can be supplemented by the new results on the basis of the methods discussed in an effort to secure more reliable investor and creditor information. A different information system that characterises business operations better can be established, and may be incorporated in business reports and the supplementary Appendixs to accounting statements. Apart from this, the results can also be used in the current modification of the accountancy act.

(6) Statistical models showed that the difference between the values measured according to the two different approaches differs in the capital markets of various countries. The more detailed exploration of the reasons thereof may help more accurately interpret the accounting statements made in the country in question.

(7) I have confirmed that the significance of various items excluded from the balance sheet (hard assets and the added value of the firm) also differ by branch of industry, which may serve as a starting point in the performance of industrial benchmarking.

(8) The findings of the research can also be used in education, since the results of the differences of the accounting and business-based valuation systems can be illustrated very spectacularly using my figures, similarly to the necessity of establishing the valuation carefully and the complexity of the information required to define the value of a company.

(9) The results also illustrate the growing tension between standard economy that is very strongly connected to money-based assessment and the alternative approaches that emphasise the significance of items that cannot be measured in monetary terms (socially responsible company, ethical company, environment-conscious company). The study has shown that both approaches are relevant, and that they actually describe the same factors, although from different viewpoints.

Recognising this fact can help a lot in moving to a different level in the socially responsible company – value maximising company debate. It casts light on the fact that the choice is not between two contrasting theories, our task is much more to set up a system that helps company managers recognise how particular business decisions affect the business value of the firm, and enables them to recognise opportunities of increasing value on this basis that do not influence accounting statements at all or indeed have a detrimental effect thereon.

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APPENDICES

APPENDIX 1

T-test
Whole sample

Variable	N	Average	Std. dev.	Av. std. error
MVTOBV99	3290	4.1833	10.9021	0.1901
MVTOBV00	3630	4.0206	15.4388	0.2562
MVTOBV01	3880	3.2918	12.0197	0.1930
MVTOBV02	3847	2.8394	11.8222	0.1906

					95% confidence interval	
Test value = 1	t	df	Sig. (2-tailed)	Average dif.	lower	upper
MVTOBV99	16.748	3289	.000	3.1833	2.8107	3.5560
MVTOBV00	11.788	3629	.000	3.0206	2.5182	3.5230
MVTOBV01	11.877	3879	.000	2.2918	1.9135	2.6701
MVTOBV02	9.651	3846	.000	1.8394	1.4658	2.2131

APPENDIX 2

T-test
Hungary

Variables	N	Average	Std. dev.	Average stand. error
MVTOBV99	**12**	**2.5547**	**3.2225**	**0.9303**
MVTOBV00	**13**	**1.2972**	**0.5786**	**0.1605**
MVTOBV01	**17**	**1.0683**	**0.4280**	**0.1038**
MVTOBV02	**17**	**0.9789**	**0.4056**	**0.0984**

					95% confidence interval	
Teszt Value = 1	t	df	Sign. (2-tailed)	Average dif.	lower	upper
MVTOBV99	1.671	11	0.123	1.5547	-0.4928	3.6022
MVTOBV00	1.852	12	0.089	0.2972	-0.0524	0.6469
MVTOBV01	0.658	16	0.520	0.0683	-0.1518	0.2884
MVTOBV02	-0.214	16	0.833	-0.0211	-0.2296	0.1874

APPENDIX 3

Paired T-test
Whole sample

Variables	Average	N	Std. dev.	Average stand. error
MVTOBV99	3.7746	3143	9.3688	0.1671
MVTOBV02	2.6601	3143	7.9279	0.1414

	N	Correlation	Sign.
MVTOBV99 & MVTOBV02	3143	0,164	.000

	Average	Std. dev.	Standard average error	95% confidence interval Lower	Uper	t	df	Sign. (2-tailed)
MV/BV 1999-2002	1,1145	11,2349	0,2004	0,7215	1,5074	5,561	3142	.000

APPENDIX 4
Variables used to describe the structure of the balance sheet

CAtoAS   Cash type assets devided by the total assets
EQtoAS   Equity devided by the total of assests
LBtoAS   Long term debt devided by the total of assests
TAtoAS   Tangible assets devided by the total of assests
FXtoAS   Fixed assests devided by the total of assests
INtoAS   Intangible assets devided by the total of assests
LItoAS   Long term investments devided by the total of assests

Other ratios

PtoB   Share price devided by the book value per share
Beta   Market based beta estimated by Bloomberg

APPENDIX 5
Anova table of the cluster analysis for the whole sample
(Lines only with a significance above 0.05 level)

Variable	1999		2000		2001		2002	
	F	Sig.	F	Sig.	F	Sig.	F	Sig.
PTOB	5.6308	0.077%	6.8696	0.013%	89.9789	0.000%	45.5699	0.000%
CATOAS	69.4512	0.000%	69.4107	0.000%	72.1413	0.000%	58.9900	0.000%
EQTOAS					4.5553	0.347%	10.3585	0.000%
LBTOAS	26.7728	0.000%	41.7863	0.000%	46.6837	0.000%	39.7439	0.000%
TATOAS	20.2334	0.000%	23.4430	0.000%	23.9631	0.000%	26.7043	0.000%
FXTOAS	42.5628	0.000%	44.6606	0.000%	46.9258	0.000%	48.5179	0.000%
INTOAS							2.9714	3.070%
LITOAS	4.9018	0.214%			3.1231	2.498%		

APPENDIX 6
Cluster data showing significant difference

Cluster	1			2			3			4			Total		
	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.
PTOB99	0.6422	2171	51.8494	5.5483	469	16.0596	13.3133	172	44.3172	6.5303	221	19.4703	2.5484	3033	45.9768
CATOAS99	0.0823	2188	0.1127	0.1431	472	0.1695	0.1970	173	0.2169	0.1560	221	0.1768	0.1035	3054	0.1403
LBTOAS99	0.2053	2190	0.1921	0.1253	472	0.1978	0.1288	173	0.3825	0.1471	221	0.1739	0.1844	3056	0.2098
TATOAS99	0.3289	2183	0.2485	0.2678	472	0.1942	0.2411	173	0.1647	0.2468	221	0.2024	0.3085	3049	0.2358
FXTOAS99	0.3337	2191	0.2471	0.2348	472	0.1846	0.2132	173	0.1454	0.2311	221	0.2018	0.3042	3057	0.2353
LITOAS99	0.0208	2189	0.0767	0.0348	468	0.0942	0.0279	173	0.0782	0.0157	221	0.0656	0.0230	3051	0.0792
PTOB00	1.6707	2357	9.8651	4.8804	533	11.1887	3.6724	186	56.6140	4.3200	230	8.7968	2.4851	3306	16.6136
CATOAS00	0.0913	2371	0.1294	0.1548	535	0.1748	0.2075	187	0.2155	0.1763	231	0.2026	0.1140	3324	0.1539
LBTOAS00	0.1953	2372	0.1875	0.1125	535	0.1744	0.1003	187	0.2387	0.1368	231	0.1748	0.1725	3325	0.1913
TATOAS00	0.3172	2357	0.2426	0.2477	535	0.1843	0.2370	187	0.1725	0.2411	231	0.2028	0.2961	3310	0.2302
FXTOAS00	0.3189	2371	0.2430	0.2185	535	0.1744	0.2158	187	0.1624	0.2202	231	0.1984	0.2901	3324	0.2308
PTOB01	1.3652	2536	4.7474	4.2531	575	8.8415	12.6844	197	30.8519	4.3489	238	15.2389	2.6626	3546	10.2133
CATOAS01	0.0955	2552	0.1268	0.1608	575	0.1618	0.2077	197	0.2047	0.1643	239	0.1910	0.1169	3563	0.1474
EQTOAS01	0.4926	2552	0.2218	0.5275	575	0.2562	0.5332	197	0.3615	0.5022	239	0.2643	0.5011	3563	0.2406
LBTOAS01	0.1983	2552	0.1855	0.1112	575	0.1598	0.1015	197	0.2616	0.1546	239	0.1885	0.1760	3563	0.1905
TATOAS01	0.3224	2528	0.2434	0.2549	575	0.1889	0.2423	197	0.1739	0.2458	238	0.2001	0.3018	3538	0.2314
FXTOAS01	0.3240	2552	0.2458	0.2229	575	0.1789	0.2152	197	0.1652	0.2295	239	0.2029	0.2953	3563	0.2340
LITOAS01	0.0232	2533	0.0751	0.0338	566	0.0824	0.0273	196	0.0629	0.0225	239	0.0794	0.0251	3534	0.0761
PTOB02	1.3467	2536	4.2712	2.7795	575	4.6889	5.5081	197	8.3896	4.3350	238	16.0248	2.0108	3546	6.2545
CATOAS02	0.1027	2552	0.1293	0.1529	575	0.1485	0.2009	197	0.1967	0.1815	239	0.1943	0.1215	3563	0.1456
EQTOAS02	0.4876	2552	0.2307	0.5385	575	0.2428	0.5407	197	0.3689	0.4593	239	0.3239	0.4969	3563	0.2503
LBTOAS02	0.1930	2552	0.1859	0.1194	575	0.1672	0.1155	197	0.2795	0.1089	239	0.1914	0.1712	3563	0.1929
TATOAS02	0.3226	2528	0.2444	0.2526	575	0.1902	0.2316	197	0.1682	0.2448	238	0.1994	0.3010	3538	0.2323
FXTOAS02	0.3245	2552	0.2471	0.2239	575	0.1811	0.2014	197	0.1572	0.2341	239	0.2028	0.2954	3563	0.2351
INTOAS02	0.1732	2527	0.1709	0.1936	575	0.1839	0.1667	197	0.1866	0.1605	238	0.1696	0.1753	3537	0.1740

APPENDIX 7

Explanatory power of the models
Explaned variable: MVTOBV02

Model	R	R²	Corrected R²	Estimation stand. error
1	.172	.030	.029	11.7228
2	.214	.046	.045	11.6267
3	.236	.056	.055	11.5680
4	.242	.059	.058	11.5513

ANOVA-table

Model		Sum of squares	df	Average squared error	F	Sig.
1	Regression	15980.909	1	15980.909	116.289	.000
	Residual	521385.809	3794	137.424		
	Total	537366.718	3795			
2	Regression	24630.418	2	12315.209	91.103	.000
	Residual	512736.301	3793	135.180		
	Total	537366.718	3795			
3	Regression	29925.888	3	9975.296	74.543	.000
	Residual	507440.831	3792	133.819		
	Total	537366.718	3795			
4	Regression	31526.814	4	7881.703	59.069	.000
	Residual	505839.905	3791	133.432		
	Total	537366.718	3795			

Koefficiensek

Modell		Non standardised coefficiences		Stand. coefficiences	t	Sig.
		B	Stand. error	Beta		
1	Constant	6.497	.387		16.770	.000
	EQTOAS02	-7.425	.689	-.172	-10.784	.000
2	Constant	11.256	.708		15.893	.000
	EQTOAS02	-13.442	1.016	-.312	-13.231	.000
	LBTOAS02	-10.667	1.334	-.189	-7.999	.000
3	Constant	10.675	.711		15.022	.000
	EQTOAS02	-14.549	1.026	-.338	-14.180	.000
	LBTOAS02	-10.110	1.330	-.179	-7.603	.000
	CATOAS02	7.919	1.259	.105	6.291	.000
4	Constant	10.046	.733		13.714	.000
	EQTOAS02	-14.623	1.025	-.340	-14.270	.000
	LBTOAS02	-10.531	1.333	-.186	-7.898	.000
	CATOAS02	8.529	1.269	.113	6.720	.000
	INTOAS02	3.790	1.094	.056	3.464	.001

APPENDIX 8.
Cluster centre – USA

	1	2	3
MVTOBV01	1.6504	5.8113	17.40917
MVTOBV02	1.5680	5.0418	8.163343
N	2283	396	45

Cluster data showing significant differences (1 percent level)

Cluster	1			2			3			Total		
	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.
CATOAS99	0.0904	2283	0.1267	0.1771	396	0.1955	0.2588	45	0.2576	0.1058	2724	0.1462
LBTOAS99	0.1971	2283	0.1968	0.1354	396	0.3175	0.1657	45	0.3518	0.1876	2724	0.2226
TATOAS99	0.2972	2283	0.2356	0.2432	396	0.1802	0.1769	45	0.1706	0.2874	2724	0.2286
FXTOAS99	0.2997	2283	0.2361	0.2214	396	0.1750	0.1450	45	0.1506	0.2858	2724	0.2293
INTOAS99	0.1743	2283	0.1735	0.1501	396	0.1628	0.1109	45	0.1262	0.1698	2724	0.1716
CATOAS00	0.0930	2283	0.1301	0.1952	396	0.2052	0.2524	45	0.1900	0.1105	2724	0.1500
EQTOAS00*	0.4930	2283	0.5285	0.5441	396	0.3448	0.3654	45	0.7162	0.4983	2724	0.5102
LBTOAS00	0.1910	2283	0.1962	0.1164	396	0.2233	0.1860	45	0.3551	0.1801	2724	0.2055
TATOAS00	0.2883	2283	0.2323	0.2286	396	0.1761	0.1579	45	0.1513	0.2775	2724	0.2253
FXTOAS00	0.2894	2283	0.2330	0.2078	396	0.1694	0.1328	45	0.1381	0.2749	2724	0.2262
INTOAS00	0.1826	2283	0.1751	0.1544	396	0.1682	0.1033	45	0.1259	0.1772	2724	0.1739
CATOAS01	0.0982	2283	0.1276	0.1989	396	0.2096	0.2961	45	0.2376	0.1161	2724	0.1508
LBTOAS01	0.1952	2283	0.1926	0.1208	396	0.2370	0.1638	45	0.3156	0.1839	2724	0.2038
TATOAS01	0.2906	2283	0.2345	0.2377	396	0.1758	0.1545	45	0.1449	0.2806	2724	0.2270
FXTOAS01	0.2929	2283	0.2357	0.2115	396	0.1696	0.1220	45	0.1021	0.2782	2724	0.2283
INTOAS01	0.1964	2283	0.1833	0.1641	396	0.1746	0.1303	45	0.1702	0.1906	2724	0.1823
CATOAS02	0.1053	2283	0.1272	0.1994	396	0.2007	0.2964	45	0.2671	0.1222	2724	0.1489
LBTOAS02	0.1874	2283	0.1924	0.1224	396	0.2578	0.1233	45	0.2028	0.1769	2724	0.2047
TATOAS02	0.2913	2283	0.2363	0.2259	396	0.1736	0.1588	45	0.1584	0.2796	2724	0.2288
FXTOAS02	0.2945	2283	0.2385	0.2019	396	0.1655	0.1223	45	0.1120	0.2782	2724	0.2309
INTOAS02*	0.1901	2283	0.1819	0.1688	396	0.1833	0.1339	45	0.1454	0.1860	2724	0.1817

* Significant at 5 percent level

Appendix 9
Linear regression for USA firms

Explanatory power of the models
Explained variable: MVTOBV02

Model	R	R^2	CorrectedR^2	Stand. error of estimation
1	.152	.023	.023	11.1271
2	.249	.062	.061	10.9055
3	.274	.075	.074	10.8317

ANOVA-table

Model		Squared sum	df	Average squared error	F	Sig.
1	Regression	8349.402	1	8349.402	67.437	.000
	Residual	353357.383	2854	123.811		
	Total	361706.785	2855			
2	Regression	22399.010	2	11199.505	94.169	.000
	Residual	339307.775	2853	118.930		
	Total	361706.785	2855			
3	Regression	27096.120	3	9032.040	76.983	.000
	Residual	334610.664	2852	117.325		
	Total	361706.785	2855			

Coefficients

Model		Nem stand. coefficients B	Nem stand. coefficients Stand. error	Stand. coefficients Beta	t	Sig.
1	Constant	5.959	.408		14.593	.000
	EQTOAS02	-5.829	.710	-.152	-8.212	.000
2	Constant	13.432	.796		16.884	.000
	EQTOAS02	-15.248	1.111	-.397	-13.721	.000
	LBTOAS02	-15.616	1.437	-.315	-10.869	.000
3	Constant	12.787	.797		16.051	.000
	EQTOAS02	-16.357	1.118	-.426	-14.636	.000
	LBTOAS02	-15.087	1.429	-.304	-10.554	.000
	CATOAS02	8.685	1.373	.120	6.327	.000

APPENDIX 10
Linear regression for German firm

Explanatory power of the models
Explained variable: MVTOBV02

Model	R	R^2	Corrected R^2	Stand. error of estimation
1	.285	.081	.074	1.8418
2	.392	.154	.141	1.7741

ANOVA-table

Model		Squared sum	df	Average squared error	F	Sig.
1	Regression	41.062	1	41.062	12.105	.001
	Residual	464.713	137	3.392		
	Total	505.775	138			
2	Regression	77.708	2	38.854	12.344	.000
	Residual	428.067	136	3.148		
	Total	505.775	138			

Coefficients

Model		Non stand. coefficients		Stand. coefficients	t	Sig.
		B	Stand. error	Beta		
1	(Constant)	2.845	.370		7.685	.000
	EQTOAS02	-2.410	.693	-.285	-3.479	.001
2	(Constant)	3.923	.476		8.233	.000
	EQTOAS02	-3.653	.760	-.432	-4.805	.000
	LBTOAS02	-5.755	1.687	-.307	-3.412	.001

APPENDIX 11
Cluster centres – Turkey

	1	2	3	4
MVTOBV01	1.33	2.88	5.92	10.62
MVTOBV02	.95	1.72	3.29	3.44
N	46	55	12	4

Cluster data showing significant differences (1 percentage level)

Cluster	1			2			3			4			Total		
	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.
EQTOAS99	0.5821	16	0.1350	0.5086	37	0.2278	0.3220	9	0.1547	0.3001	3	0.2310	0.4912	65	0.2147
INTOAS99*	0.0127	16	0.0366	0.0107	37	0.0251	0.0417	9	0.0461	0.0384	3	0.0392	0.0168	65	0.0334
EQTOAS00	0.5970	35	0.2100	0.5311	50	0.1710	0.3229	10	0.1686	0.2295	3	0.2226	0.5242	98	0.2066
INTOAS00*	0.0121	35	0.0303	0.0102	50	0.0294	0.0404	10	0.0476	0.0529	3	0.0535	0.0153	98	0.0340
EQTOAS01	0.6124	46	0.2030	0.4841	55	0.1934	0.2345	12	0.1986	0.1268	4	0.2708	0.4967	117	0.2372
INTOAS01*	0.0157	46	0.0412	0.0066	55	0.0130	0.0326	12	0.0519	0.0311	4	0.0277	0.0137	117	0.0329
EQTOAS02	0.6495	46	0.1985	0.5439	55	0.1835	0.3276	12	0.2180	0.2026	4	0.1700	0.5516	117	0.2223
INTOAS02	0.0199	46	0.0491	0.0083	55	0.0221	0.0275	12	0.0510	0.1974	4	0.2756	0.0213	117	0.0673

* Significant at 5 percentage level

Appendix 12
Linear regression for Turkish firms

Explanatory power of the models
Explained variable: MVTOBV02

Model	R	R^2	Corrected R^2	Stand. error of estimation
1	.480	.231	.226	1.8422
2	.540	.291	.282	1.7742

ANOVA-table

Model		Squared sum	df	Average squared error	F	Sig.
1	Regression	148.670	1	148.670	43.808	.000
	Residual	495.473	146	3.394		
	Total	644.143	147			
2	Regression	187.692	2	93.846	29.812	.000
	Residual	456.451	145	3.148		
	Total	644.143	147			

Coefficients

Model		Non stand. coefficients B	Non stand. coefficients Stand. error	Stand. coefficients Beta	t	Sig.
1	(Constant)	4.197	.354		11.847	.000
	EQTOAS02	-3.964	.599	-.480	-6.619	.000
2	(Constant)	5.192	.443		11.718	.000
	EQTOAS02	-5.130	.665	-.622	-7.713	.000
	LBTOAS02	-5.091	1.446	-.284	-3.521	.001

APPENDIX 13
Cluster centres – Hungary

	1	2	3
MVTOBV01	0,27	0,97	1,48
MVTOBV02	0,33	0,84	1,40
N	2	9	6

Cluster data showing significant differences (1 percentage level)

Cluster	1			2			3			Total		
	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.
CATOAS00*	0.3725	2	0.3297	0.0900	7	0.0540	0.0655	4	0.0768	0.1259	13	0.1552
EQTOAS00*	0.9206	2	0.0056	0.6274	7	0.0982	0.5935	4	0.1534	0.6621	13	0.1553
CATOAS01*	0.3908	2	0.3825	0.1054	9	0.1151	0.0360	6	0.0395	0.1145	17	0.1678
EQTOAS01	0.9059	2	0.0257	0.6442	9	0.1116	0.4879	6	0.1654	0.6198	17	0.1786
CATOAS02*	0.4219	2	0.4054	0.0922	9	0.1013	0.0619	6	0.0472	0.1203	17	0.1709
EQTOAS02*	0.8659	2	0.0849	0.6464	9	0.1114	0.5126	6	0.1810	0.6250	17	0.1707

* Significant at 5 percentage level

14. Appendix
Linear regression for Hungarain firms

Explanatory power of the model
Explained variable: MVTOBV02

Model	R	R^2	Corrected R^2	Stand. error of estimation
1	.657	.432	.394	.3158

ANOVA-table

Model		Squared sum	df	Average squared error	F	Sig.
1	Regression	1.136	1	1.136	11.391	.004
	Residual	1.496	15	9.974E-02		
	Total	2.632	16			

Coefficients

Model		Non stand. coefficients B	Non stand. coefficients Stand. error	Stand. coefficients Beta	t	Sig.
1	(Constant)	1.954	.299		6.536	.000
	EQTOAS02	-1.561	.462	-.657	-3.375	.004

APPENDIX 15
Faktor and clusteranalysis for the whole sample (2002)

Communalities (main component method)					(Varimax method) Components		
	Starting	**Final**			**1**	**2**	**3**
CATOAS02	1.000	.522		CATOAS02	-.691	-.186	-.104
EQTOAS02	1.000	.643		EQTOAS02	-.800	.024	.046
LBTOAS02	1.000	.697		LBTOAS02	.821	.135	-.071
TATOAS02	1.000	.868		TATOAS02	.292	.868	.173
FXTOAS02	1.000	.925		FXTOAS02	.340	.886	-.154
INTOAS02	1.000	.633		INTOAS02	.417	-.675	-.056
LITOAS02	1.000	.986		LITOAS02	-.011	.036	.992

Rotated component matrix

Final cluster centres

Clusterek	1	2	3	4	5	6
Factor1	.11934	-.13994	-1.24451	.46235	.10528	1.09139
Factor2	.26882	.07162	-.18902	1.38422	-.25778	-1.15547
Factor3	7.89332	2.63842	-.23673	-.23609	-.13880	-.15866
N	26	178	938	843	1114	625

MVTOBV02 value

Cluster	Average	N	Std. dev.
1	2.6989	26	3.0523
2	2.2016	178	2.3261
3	2.8169	936	4.8871
4	1.7466	831	2.3111
5	2.7065	1109	7.7196
6	2.7086	621	11.9709
Total	2.4949	3701	7.0421

ANOVA table (MVTOBV02 - Clusters)

	Négyzet összeg	df	Average squared error	F	Sig.
Between groups	656.809	5	131.362	2.655	.021
Within groups	182829.408	3695	49.480		
Total	183486.217	3700			

ANOVA-table for clusters

		Squared sum	df	Average squared error	F	Sig.
CATOAS02	Between groups	36.697	5	7.339	493.667	.000
	Within groups	55.276	3718	.015		
	Total	91.973	3723			
EQTOAS02	Between groups	73.551	5	14.710	461.916	.000
	Within groups	118.403	3718	.032		
	Total	191.954	3723			
LBTOAS02	Between groups	35.761	5	7.152	416.820	.000
	Within groups	63.797	3718	.017		
	Total	99.557	3723			
TATOAS02	Between groups	123.809	5	24.762	1219.627	.000
	Within groups	75.486	3718	.020		
	Total	199.295	3723			
FXTOAS02	Between groups	134.250	5	26.850	1573.599	.000
	Within groups	63.439	3718	.017		
	Total	197.689	3723			
INTOAS02	Between groups	54.808	5	10.962	710.116	.000
	Within groups	57.393	3718	.015		
	Total	112.201	3723			
LITOAS02	Between groups	17.332	5	3.466	3206.264	.000
	Within groups	4.020	3718	.001		
	Total	21.352	3723			
MVTOBV99	Between groups	5885.765	5	1177.153	13.638	.000
	Within groups	263596.742	3054	86.312		
	Total	269482.506	3059			
MVTOBV00	Between groups	3031.446	5	606.289	25.054	.000
	Within groups	81383.642	3363	24.200		
	Total	84415.088	3368			
MVTOBV01	Between groups	2823.964	5	564.793	11.801	.000
	Within groups	171629.001	3586	47.861		
	Total	174452.966	3591			
MVTOBV02	Between groups	656.809	5	131.362	2.655	.021
	Within groups	182829.408	3695	49.480		
	Total	183486.217	3700			

		Squared sum	df	Average squared error	F	Sig.
CATOAS99	Between groups	11.733	5	2.347	125.195	0.000
	Within groups	60.035	3203	0.019		
	Total	71.768	3208			
EQTOAS99	Between groups	26.882	5	5.376	13.817	0.000
	Within groups	1,247.110	3205	0.389		
	Total	1,273.993	3210			
LBTOAS99	Between groups	25.918	5	5.184	148.255	0.000
	Within groups	112.026	3204	0.035		
	Total	137.945	3209			
TATOAS99	Between groups	83.017	5	16.603	561.470	0.000
	Within groups	94.776	3205	0.030		
	Total	177.792	3210			
FXTOAS99	Between groups	94.646	5	18.929	751.217	0.000
	Within groups	80.760	3205	0.025		
	Total	175.406	3210			
INTOAS99	Between groups	23.874	5	4.775	229.213	0.000
	Within groups	66.763	3205	0.021		
	Total	90.637	3210			
LITOAS99	Between groups	8.333	5	1.667	455.464	0.000
	Within groups	11.710	3200	0.004		
	Total	20.043	3205			

		Squared sum	df	Average squared error	F	Sig.
CATOAS00	Between groups	16.833	5	3.367	161.416	0.000
	Within groups	72.205	3462	0.021		
	Total	89.038	3467			
EQTOAS00	Between groups	68.372	5	13.674	5.932	0.000
	Within groups	7,982.769	3463	2.305		
	Total	8,051.141	3468			
LBTOAS00	Between groups	24.774	5	4.955	153.577	0.000
	Within groups	111.693	3462	0.032		
	Total	136.467	3467			
TATOAS00	Between groups	90.291	5	18.058	678.327	0.000
	Within groups	92.138	3461	0.027		
	Total	182.429	3466			
FXTOAS00	Between groups	103.762	5	20.752	941.284	0.000
	Within groups	76.304	3461	0.022		
	Total	180.066	3466			
INTOAS00	Between groups	29.925	5	5.985	291.793	0.000
	Within groups	71.009	3462	0.021		
	Total	100.934	3467			
LITOAS00	Between groups	7.380	5	1.476	398.063	0.000
	Within groups	12.792	3450	0.004		
	Total	20.172	3455			

		Squared sum	df	Average squared error	F	Sig.
CATOAS01	Between groups	20.711	5	4.142	227.948	0.000
	Within groups	67.163	3696	0.018		
	Total	87.874	3701			
EQTOAS01	Between groups	66.240	5	13.248	6.520	0.000
	Within groups	7,509.890	3696	2.032		
	Total	7,576.130	3701			
LBTOAS01	Between groups	26.010	5	5.202	153.868	0.000
	Within groups	124.957	3696	0.034		
	Total	150.967	3701			
TATOAS01	Between groups	103.313	5	20.663	821.151	0.000
	Within groups	93.002	3696	0.025		
	Total	196.315	3701			
FXTOAS01	Between groups	116.645	5	23.329	1,111.356	0.000
	Within groups	77.585	3696	0.021		
	Total	194.230	3701			
INTOAS01	Between groups	34.979	5	6.996	332.851	0.000
	Within groups	77.661	3695	0.021		
	Total	112.640	3700			
LITOAS01	Between groups	10.223	5	2.045	707.319	0.000
	Within groups	10.661	3688	0.003		
	Total	20.884	3693			

Cluster centres

Cluster		CATOAS02	EQTOAS02	LBTOAS02	TATOAS02	FXTOAS02	INTOAS02	LITOAS02	MVTOBV99	MVTOBV00	MVTOBV01	MVTOBV02
1	Average	0.0781	0.5301	0.1472	0.6531	0.0859	0.0532	0.6274	2.9722	4.3851	3.2439	2.6989
	N	26	26	26	26	26	26	26	19	22	25	26
	Std. dev.	0.1037	0.3185	0.1924	0.2497	0.0946	0.0733	0.1852	2.4281	5.3079	3.8868	3.0523
2	Average	0.1172	0.5605	0.1194	0.4015	0.1977	0.1239	0.2247	5.2957	4.2670	2.9991	2.2016
	N	178	178	178	178	178	178	178	138	153	173	178
	Std. dev.	0.1091	0.2498	0.1482	0.1528	0.1471	0.1203	0.0821	9.6309	5.9923	3.2788	2.3261
3	Average	0.2979	0.7401	0.0164	0.1596	0.1526	0.0974	0.0091	5.7859	4.5744	4.1979	2.8169
	N	938	938	938	938	938	938	938	774	860	896	936
	Std. dev.	0.2000	0.1451	0.0366	0.1208	0.1220	0.1016	0.0232	15.2842	6.5529	12.8886	4.8871
4	Average	0.0508	0.4501	0.2436	0.6102	0.6315	0.0759	0.0110	2.1080	2.0190	1.7680	1.7466
	N	843	843	843	843	843	843	843	687	755	814	831
	Std. dev.	0.0574	0.1878	0.1688	0.1919	0.1485	0.0751	0.0250	3.5527	3.4033	2.1776	2.3111
5	Average	0.0935	0.4497	0.1324	0.2223	0.2295	0.1756	0.0107	3.0191	2.8467	2.5288	2.7065
	N	1114	1114	1114	1114	1114	1114	1114	905	1006	1077	1109
	Std. dev.	0.0958	0.1737	0.1106	0.1239	0.1295	0.1312	0.0236	4.1567	3.5337	3.4802	7.7196
6	Average	0.0564	0.3482	0.2836	0.1585	0.1538	0.4282	0.0086	3.7007	2.9980	2.3591	2.7086
	N	625	625	625	625	625	625	625	537	573	607	621
	Std. dev.	0.0623	0.1870	0.1796	0.1134	0.1146	0.1839	0.0227	9.2567	5.4782	2.5227	11.9709
Total	Average	0.1301	0.5117	0.1532	0.2952	0.2859	0.1724	0.0245	3.7364	3.2025	2.7717	2.4949
	N	3724	3724	3724	3724	3724	3724	3724	3060	3369	3592	3701
	Std. dev.	0.1572	0.2271	0.1635	0.2314	0.2304	0.1736	0.0757	9.3859	5.0064	6.9700	7.0421

Cluster		CATOAS99	EQTOAS99	LBTOAS99	TATOAS99	FXTOAS99	INTOAS99	LITOAS99
1	Average	0.0664	0.5180	0.1276	0.5706	0.0819	0.0974	0.5326
	N	20	20	20	20	20	20	20
	Std. dev.	0.0693	0.4291	0.1506	0.3245	0.0936	0.2194	0.3110
2	Average	0.1144	0.5613	0.1226	0.3448	0.2026	0.1389	0.1646
	N	141	141	141	141	141	141	141
	Std. dev.	0.1241	0.3329	0.1543	0.2112	0.1699	0.1575	0.1645
3	Average	0.2105	0.6151	0.0506	0.1916	0.1779	0.1078	0.0137
	N	818	818	818	818	818	818	817
	Std. dev.	0.1951	1.0885	0.1049	0.1487	0.1426	0.1233	0.0496
4	Average	0.0586	0.4645	0.2652	0.5911	0.6116	0.0839	0.0133
	N	722	723	723	723	723	723	720
	Std. dev.	0.0891	0.2047	0.1872	0.2220	0.1876	0.0963	0.0532
5	Average	0.0892	0.4569	0.1619	0.2327	0.2442	0.1625	0.0128
	N	943	943	943	943	943	943	943
	Std. dev.	0.1276	0.3158	0.1616	0.1476	0.1555	0.1452	0.0356
6	Average	0.0655	0.3447	0.2846	0.1957	0.1884	0.3348	0.0114
	N	565	566	565	566	566	566	565
	Std. dev.	0.0999	0.4905	0.2959	0.1481	0.1443	0.2036	0.0388
Total	Average	0.1100	0.4841	0.1764	0.3034	0.2974	0.1598	0.0228
	N	3209	3211	3210	3211	3211	3211	3206
	Std. dev.	0.1496	0.6300	0.2073	0.2353	0.2338	0.1680	0.0791

Cluster		CATOAS00	EQTOAS00	LBTOAS00	TATOAS00	FXTOAS00	INTOAS00	LITOAS00
1	Average	0.1081	0.5572	0.1314	0.5359	0.0966	0.0615	0.4815
	N	22	22	22	22	22	22	22
	Std. dev.	0.1821	0.3139	0.1759	0.3208	0.1124	0.0719	0.3352
2	Average	0.1158	0.5661	0.1262	0.3266	0.1967	0.1500	0.1504
	N	155	155	155	155	155	155	154
	Std. dev.	0.1327	0.2972	0.2165	0.1936	0.1575	0.1733	0.1396
3	Average	0.2364	0.6607	0.0445	0.1790	0.1633	0.1073	0.0159
	N	883	883	883	883	883	883	878
	Std. dev.	0.2096	0.4978	0.1338	0.1451	0.1370	0.1224	0.0571
4	Average	0.0601	0.4596	0.2473	0.5815	0.6008	0.0856	0.0128
	N	777	777	777	777	777	777	776
	Std. dev.	0.0904	0.2021	0.1778	0.2110	0.1755	0.0924	0.0500
5	Average	0.0942	0.4414	0.1528	0.2243	0.2306	0.1730	0.0136
	N	1035	1036	1035	1034	1034	1035	1031
	Std. dev.	0.1250	0.7360	0.1780	0.1389	0.1434	0.1457	0.0356
6	Average	0.0719	0.2321	0.2676	0.1787	0.1680	0.3560	0.0146
	N	596	596	596	596	596	596	595
	Std. dev.	0.1126	3.4680	0.2272	0.1368	0.1330	0.2029	0.0476
Total	Average	0.1200	0.4716	0.1648	0.2915	0.2833	0.1664	0.0233
	N	3468	3469	3468	3467	3467	3468	3456
	Std. dev.	0.1603	1.5237	0.1984	0.2294	0.2279	0.1706	0.0764

Cluster		CATOAS01	EQTOAS01	LBTOAS01	TATOAS01	FXTOAS01	INTOAS01	LITOAS01
1	Average	0.0941	0.5265	0.1391	0.5608	0.0894	0.0902	0.5094
	N	25	25	25	25	25	25	25
	Std. dev.	0.1473	0.2864	0.1749	0.2882	0.0907	0.1424	0.3076
2	Average	0.1289	0.4881	0.1346	0.3575	0.2037	0.1407	0.1739
	N	177	177	177	177	177	177	176
	Std. dev.	0.1344	0.5428	0.1962	0.1766	0.1495	0.1583	0.1261
3	Average	0.2486	0.6499	0.0483	0.1827	0.1682	0.1202	0.0150
	N	928	928	928	928	928	928	927
	Std. dev.	0.2018	0.4111	0.1389	0.1434	0.1374	0.1344	0.0513
4	Average	0.0553	0.4465	0.2505	0.5940	0.6122	0.0871	0.0130
	N	838	838	838	838	838	838	836
	Std. dev.	0.0727	0.2122	0.1787	0.2031	0.1672	0.0952	0.0376
5	Average	0.0953	0.4460	0.1490	0.2263	0.2310	0.1819	0.0133
	N	1109	1109	1109	1109	1109	1108	1107
	Std. dev.	0.1123	0.3118	0.2097	0.1361	0.1391	0.1473	0.0324
6	Average	0.0766	0.2330	0.2692	0.1747	0.1653	0.3761	0.0128
	N	625	625	625	625	625	625	623
	Std. dev.	0.1084	3.3860	0.1964	0.1352	0.1335	0.1978	0.0366
Total	Average	0.1231	0.4638	0.1663	0.2984	0.2882	0.1752	0.0246
	N	3702	3702	3702	3702	3702	3701	3694
	Std. dev.	0.1541	1.4308	0.2020	0.2303	0.2291	0.1745	0.0752

APPENDIX 16
Industry specific effects

Cross table

Industry	1	2	3	4	5	6	Total		Industry	1	2	3	4	5	6	Össz.
									- cont. -							
Mining		2	6	22	9	2	41		Toys/Games/Hobbies			4		7	1	12
Biotechnology	1	2	60	6	19	9	97		Commercial Services	3	5	38	31	62	49	188
Packaging & Containers				8	5	7	20		Retail		5	50	77	73	21	226
Pipelines				7	3	1	11		Cosmetics/Personal Care		1	5	1	3	4	14
Housewares	1	2	1		4	3	11		Environmental Control	1	2	7	7	16	16	49
Health. services		2	13	17	22	22	76		Home Furnishings		1	7	6	18	3	35
Health. products	1	3	100	7	58	24	193		Airlines		1	2	14	3		20
Machinery-Diversified		3	13	4	44	23	87		Media	2	4	8	9	12	32	67
Miscellaneous Manufacturing		5	11	16	35	24	91		Agriculture			3	5	4	5	17
Electrical Compo.& Equipment	2	6	2	45	37	8	100		Distribution/Wholesale		2	7	1	20	8	38
Electric		5	68	13	54	30	170		Machinery-Constr&Mining		1			2	2	5
Electronics		2	14	5	15	8	44		Oil&Gas		3	7	102	8	1	121
Food Service			1				1		Oil&Gas Services	1	1	2	23	12	8	47
Food	1	4	15	35	38	15	108		Forest Products&Paper			1	31	2	3	37
Energy-Alternate Sources		1		1		5	7		Storage/Warehousing				1		1	2
Building Materials		7	9	24	27	5	72		Apparel		3	21	6	21	8	59
Engineering & Construction		5	6	5	28	7	51		Leisure Time		3	6	8	11	6	34
Semiconductors	1	14	48	14	20	10	107		Lodging		2	1	19	1	3	26
Metal Fabricate/Hardware		1	3	12	21	6	43		Transportation		1	4	47	10	8	70
Gas				14	9	1	24		Computers		9	70	2	65	32	178
Auto Parts & Equipment		3	13	5	20	10	51		Coal				1			1
Auto Manufacturers	2	5	1	3	5	3	19		Hand/Machine Tools			1	1	15	7	24
Pharmaceuticals	2	8	75	6	41	15	147		Software		12	81	1	46	37	177
Shipbuilding				1			1		Entertainment		1	7	17	8	10	43
Home Builders		2	7	2	10	12	33		Trucking&Leasing	1	1		3			5
Household Products/Wares			9	2	10	12	33		Telecommunications	1	17	61	48	55	24	206
Advertising			1	1	6	5	13		Textiles	1	2	2	12	13	7	37
Real Estate	1		1	3		1	6		Iron/Steel		1	2	26	12	1	42
Internet	1	5	34	2	17	15	74		Aerospace/Defense			4	4	16	18	42
Office Furnishings			2	2	1	1	6		Chemicals		4	12	30	30	18	94
Office/Business Equip		4		1	1		6		Water		1		10			11
Beverages	2	2	2	14	9	8	37		**Total**	**25**	**176**	**928**	**839**	**1114**	**625**	**3707**

Chi-quare test

	Value	df	Sig. (2-tailed)
Pearson Chi-quare	1875.254	325	.000
Likelihood ratio	1760.079	325	.000

		Value	Asymp. std. dev.	Approx. T	Approx. Sig.
Lambda	Simmetric	.110	.008	13.481	.000
	Region dependent	.034	.006	5.756	.000
	Cluster dependent	.212	.015	12.882	.000
Goodman-Kruskal tau	Region dependent	.012	.001		.000
	Cluster dependent	.132	.006		.000

	Value	Approx. Sig.
Phi	.710	.000
Cramer's V	.317	.000
Contingency koeficiens	.579	.000

APPENDIX 17
Regio specific effects

Crosstable (number of elements)

Region	Clusters						Total
	1	2	3	4	5	6	
DAM	2	3	19	102	42	10	178
KEU	8	26	51	64	42	2	193
NYEU	2	32	125	127	215	85	586
US	14	117	743	550	815	528	2767
Total	26	178	938	843	1114	625	3724

Chi-square test

	Value	df	Sig.. (2-tailed)
Pearson Chi-square	275.348	15	.000
Likelihood Ratio	249.671	15	.000

		Value	Asymp. Std. dev.	Approx. T	Approx. Sig.
Lambda	Szimetrikus	.023	.004	5.205	.000
	Region dependent	.000	.000	.	.
	Cluster dependent	.031	.006	5.205	.000
Goodman-Kruskal tau	Region dependent	.021	.003		.000
	Cluster dependent	.016	.002		.000

	Value	Approx. Sig.
Phi	.272	.000
Cramer's V	.157	.000
Contingency coefficient	.262	.000

APPENDIX 18
Country specific effects

Crosstable (number of elements)

Country	Clusters 1	2	3	4	5	6	Total
Argentina			1				1
Austria		1	1	5	4	3	14
Belgium					1		1
Brazil	2	3	11	46	33	7	102
Chile			6	55	9	3	73
Croatia					1		1
Czech Rep.				1			1
Denmark			4	2	6	3	15
Estonia.			2	1			3
Finland		4	18	35	40	5	102
France			2	1	5	2	10
Germany	1	8	43	7	58	22	139
Greece		8	8	17	10		43
Hungary		1	4	11	1		17
Island			1				1
Italy		3	2	2	9	5	21
Luxemburg				1	1	1	3
Netherlands		2	6	6	10	8	32
Norway			17	24	20	6	67
Panama			1				1
Poland		2	4	10	4		20
Portugal				3	3	1	7
Russia				2	1		3
Spain		3		5	5	2	15
Sweden.	1	3	16	12	37	19	88
Switzerland			3	2	4	5	14
Turkey	8	23	41	39	35	2	148
UK			4	5	2	3	14
USA.	14	117	743	550	815	528	2767
Venezuela				1			1
Total	**26**	**178**	**938**	**843**	**1114**	**625**	**3724**

Chi-square test

	Value	df	Sig.. (2-tailed)
Pearson Chi-square	495.608	145	.000
Likelihood Ratio	466.816	145	.000

		Value	Asymp. Std. dev.	Approx. T	Approx. Sig.
Lambda	Symmetric.	.029	.005	5.488	.000
	Region dependent	.000	.000	.	.
	Cluster dependent	.040	.007	5.488	.000
Goodman-Kruskal tau	Region dependent	.017	.003		.000
	Cluster dependent	.030	.003		.000

	Value	Approx. Sig.
Phi	.365	.000
Cramer's V	.163	.000
Contingency coefficient	.343	.000

APPENDIX 19
Industry and country specific effects

Explained variable: ln(MVTOBV99)

R	R^2	Corrected R^2	Stand. error of estimation
0.440	0.194	0.190	0.8712

ANOVA-table

	Squared sum	df	Average squared error	F	Sig.
Regression	597.130	17.000	35.125	46.279	0.000
Residual	2483.432	3272.000	0.759		
Total	3080.562	3289.000			

Coefficients

	Non stand. coefficients		Stand. coefficients	t	Sig.
	B	Stand. error	Beta		
Constant	0.951	0.057		16.579	0.000
KLA2	-0.355	0.093	-0.073	-3.806	0.000
KLA3	-0.327	0.064	-0.143	-5.096	0.000
KLA4	-0.609	0.066	-0.256	-9.234	0.000
KLA5	-0.487	0.063	-0.225	-7.784	0.000
KLA6	-0.380	0.067	-0.145	-5.663	0.000
DAM	-0.265	0.076	-0.056	-3.465	0.001
SW	0.385	0.124	0.049	3.119	0.002
TU	0.740	0.105	0.112	7.035	0.000
BIOTECH	1.325	0.097	0.221	13.711	0.000
COMP	0.713	0.072	0.161	9.918	0.000
COMSER	0.210	0.070	0.048	2.981	0.003
HEALTH	0.427	0.068	0.103	6.243	0.000
PHARMA	0.778	0.078	0.162	9.970	0.000
RETAIL	0.147	0.065	0.037	2.272	0.023
SEMIC	0.666	0.094	0.115	7.117	0.000
SOFTW	0.806	0.073	0.180	11.057	0.000
TELECO	0.560	0.069	0.132	8.152	0.000

Explained variable: ln(MVTOBV00)

R	R^2	Corrected R^2	Stand. error of estimation
0.418	0.175	0.171	0.854

ANOVA-table

	Squared sum	df	Average squared error	F	Sig.
Regression	557.575	18.000	30.976	42.512	0.000
Residual	2631.130	3611.000	0.729		
Total	3188.705	3629.000			

Coefficients

	Non stand. coefficients		Stand. coefficients	t	Sig.
	B	Stand. error	Beta		
Constant	0.882	0.054		16.405	0.000
KLA2	-0.283	0.087	-0.061	-3.260	0.001
KLA3	-0.375	0.060	-0.170	-6.295	0.000
KLA4	-0.542	0.061	-0.235	-8.846	0.000
KLA5	-0.468	0.058	-0.224	-8.100	0.000
KLA6	-0.430	0.063	-0.167	-6.865	0.000
DAM	-0.242	0.074	-0.051	-3.255	0.001
KEU	-0.391	0.173	-0.079	-2.264	0.024
NYEU	0.126	0.047	0.045	2.694	0.007
GER	0.314	0.104	0.050	3.018	0.003
TU	0.812	0.190	0.150	4.277	0.000
BIOTECH	1.211	0.091	0.207	13.359	0.000
COMP	0.569	0.066	0.134	8.575	0.000
ELECTCS	0.230	0.069	0.052	3.335	0.001
HEALTH	0.604	0.066	0.145	9.216	0.000
PHARMA	0.758	0.074	0.159	10.201	0.000
SEMIC	0.660	0.085	0.121	7.799	0.000
SOFTW	0.626	0.068	0.143	9.150	0.000
TELECO	0.533	0.062	0.134	8.592	0.000

Explained variable: ln(MVTOBV01)

R	R^2	CorrectedR^2	Stand. error of estimation
0.380	0.144	0.141	0.769

ANOVA-table

	Squared sum	df	Average squared error	F	Sig.
Regression	384.791	16.000	24.049	40.667	0.000
Residual	2284.474	3863.000	0.591		
Total	2669.266	3879.000			

Coefficients

	Non stand. coefficients		Stand. coefficients	t	Sig.
	B	Stand. error	Beta		
Constant	0.856	0.045		19.103	0.000
KLA2	-0.296	0.074	-0.074	-4.022	0.000
KLA3	-0.329	0.051	-0.167	-6.443	0.000
KLA4	-0.511	0.052	-0.251	-9.809	0.000
KLA5	-0.413	0.049	-0.223	-8.357	0.000
KLA6	-0.391	0.054	-0.171	-7.280	0.000
KEU	-0.436	0.118	-0.109	-3.713	0.000
DAM	-0.220	0.066	-0.051	-3.330	0.001
TU	0.817	0.135	0.177	6.047	0.000
BIOTECH	0.880	0.081	0.165	10.808	0.000
COMP	0.312	0.058	0.082	5.376	0.000
COMSER	0.140	0.057	0.037	2.440	0.015
HEALTH	0.598	0.059	0.157	10.170	0.000
PHARMA	0.835	0.065	0.197	12.894	0.000
SEMIC	0.249	0.076	0.050	3.282	0.001
SOFTW	0.448	0.059	0.117	7.583	0.000
TELECO	0.291	0.054	0.081	5.347	0.000

Explained variable: ln(MVTOBV02)

R	R²	Corrected R²	Stand. error of estimation
0.335	0.112	0.108	0.733

ANOVA-table

	Squared sum	df	Average squared error	F	Sig.
Regression	259.578	18.000	14.421	26.809	0.000
Residual	2059.114	3828.000	0.538		
Total	2318.692	3846.000			

Coefficients

	Non stand. coefficients		Stand. coefficients	t	Sig.
	B	Stand. error	Beta		
(Constant)	0.967	0.058		16.797	0.000
KLA2	-0.492	0.079	-0.133	-6.242	0.000
KLA3	-0.524	0.062	-0.289	-8.469	0.000
KLA4	-0.589	0.062	-0.312	-9.491	0.000
KLA5	-0.455	0.060	-0.265	-7.526	0.000
KLA6	-0.499	0.064	-0.236	-7.834	0.000
DAM	-0.220	0.062	-0.057	-3.545	0.000
NYEU	-0.117	0.038	-0.056	-3.041	0.002
GER	-0.258	0.071	-0.063	-3.634	0.000
HU	-0.618	0.179	-0.053	-3.453	0.001
NO	-0.246	0.094	-0.043	-2.625	0.009
BIOTECH	0.746	0.075	0.154	9.900	0.000
COMSER	0.218	0.055	0.061	3.984	0.000
ELECTRIC	-0.201	0.075	-0.042	-2.680	0.007
FOOD	0.152	0.072	0.033	2.118	0.034
HEALTH	0.431	0.056	0.121	7.715	0.000
PHARMA	0.576	0.061	0.146	9.382	0.000
SEMIC	-0.178	0.072	-0.038	-2.477	0.013
SOFTW	0.286	0.057	0.079	5.033	0.000

APPENDIX 20

Final cluster centres

Cluster	1	2
TATOAS99	.59	.18
FXTOAS99	.58	.18
TATOAS00	.58	.17
FXTOAS00	.57	.16
TATOAS01	.58	.18
FXTOAS01	.57	.17
TATOAS02	.57	.17
FXTOAS02	.56	.17
N	**1005**	**2451**

Explanation power of the linear regressions

Year	R	R^2	Corrected R^2	Stand. error of estimation
1999	0.3910	0.1529	0.1461	0.7182
2000	0.4400	0.1936	0.1854	0.6538
2001	0.3804	0.1447	0.1380	0.6224
2002	0.3081	0.0950	0.0878	0.5923

Description of the linear regressions

		Non stand. coefficients		Stand. coefficients	t	Sig.
		B	Stand. error	Beta		B
1999	Constant	0.5553	0.0452		12.2769	0.0000
	SEMIC	1.2846	0.1817	0.2211	7.0712	0.0000
	BIOTECH	1.4761	0.2188	0.2113	6.7468	0.0000
	KLA4	-0.2264	0.0520	-0.1378	-4.3544	0.0000
	INFL99	0.0080	0.0019	0.1321	4.2116	0.0000
	ELECTRIC	-0.4241	0.1491	-0.0890	-2.8456	0.0045
	COMP	0.8014	0.2956	0.0850	2.7114	0.0068
	RETAIL	0.1999	0.0827	0.0761	2.4167	0.0159
2000	Constant	0.2451	0.0830		2.9513	0.0032
	SEMIC	1.3377	0.1607	0.2521	8.3239	0.0000
	BIOTECH	1.7126	0.2197	0.2359	7.7947	0.0000
	INFL00	0.0865	0.0221	0.8142	3.9170	0.0001
	KLA4	-0.2294	0.0474	-0.1494	-4.8413	0.0000
	OILGAS	0.2448	0.0694	0.1088	3.5304	0.0004
	DAM	-0.4704	0.1066	-0.1546	-4.4135	0.0000
	KEU	-2.5146	0.7781	-0.6729	-3.2315	0.0013
	ELECTCS	0.4436	0.1656	0.0811	2.6793	0.0075
	TELECO	0.2116	0.1022	0.0651	2.0690	0.0388
2001	Constant	0.5869	0.0414		14.1748	0.0000
	KLA4	-0.3002	0.0447	-0.2103	-6.7131	0.0000
	INFL01	0.0403	0.0100	0.7682	4.0269	0.0001
	BIOTECH	1.0115	0.2366	0.1331	4.2746	0.0000
	HEALTH	0.6956	0.1684	0.1289	4.1315	0.0000
	DAM	-0.5321	0.1105	-0.1772	-4.8145	0.0000
	KEU	-2.0721	0.6602	-0.5998	-3.1384	0.0018
	NYEU	-0.1855	0.0756	-0.0777	-2.4518	0.0144
2002	Constant	0.7200	0.0517		13.9206	0.0000
	KLA4	-0.3640	0.0566	-0.2743	-6.4355	0.0000
	BIOTECH	0.9841	0.1991	0.1581	4.9417	0.0000
	DAM	-0.2784	0.0861	-0.1039	-3.2320	0.0013
	NYEU	-0.2204	0.0708	-0.0996	-3.1125	0.0019
	KLA5	-0.2205	0.0757	-0.1193	-2.9134	0.0037
	KLA6	-0.2447	0.1079	-0.0805	-2.2683	0.0235
	FOOD	0.1964	0.0919	0.0684	2.1381	0.0328

APPENDIX 21
Cluster on variance

Cluster centres

	1	2	3	4	Outlier
Variance	3.3248	63.6226	169.0646	293.4857	–
N	2702	161	72	37	73

Cluster on variance – Industry crosstable

Industry	1	2	3	4	Total
Mining	25	1	1		27
Biotechnology	44	12	6	5	67
Packaging&Containers	15				15
Pipelines	11				11
Housewares	10				10
Healthcare-Services	65	3			68
Machinery-Diversified	71	1			72
Miscellaneous Manufacturing	80				80
Electrical Compo&Equip	38	1	2	1	42
Electric	79	1			80
Electronics	135	4	5	1	145
Food Service	1				1
Food	79	1			80
Energy-Alternate Sources	3	1			4
Building Materials	50				50
Engineering&Construction	30	1			31
Healthcare-Products	137	19	5	5	166
Semiconductors	73	14	1	1	89
Metal Fabricate/Hardware	40				40
Gas	22				22
Auto Parts&Equipment	35		1		36
Auto Manufacturers	15	1			16
Pharmaceuticals	85	19	9	4	117
Shipbuilding	1				1
Home Builders	30				30
Household Products/Wares	26				26
Advertising	10	2			12
Real Estate	6				6
Internet	23	9	9	1	42
Office Furnishings	6				6
Office/Business Equip	5	1			6
Beverages	27	1		2	30

Industry	1	2	3	4	Total
Toys/Games/Hobbies	11				11
Commercial Services	142	10	1		153
Retail	187	1	3		191
Environmental Control	37	2			39
Cosmetics/Personal Care	10		1		11
Home Furnishings	29	1			30
Airlines	18				18
Media	26	5		2	33
Agriculture	15				15
Distribution/Wholesale	35	2			37
Machinery-Constr&Mining	5				5
Oil&Gas	109				109
Oil&Gas Services	49				49
Total	29				29
Forest Products&Paper	1				1
Storage/Warehousing	45	1			46
Apparel	21	1			22
Leisure Time	18				18
Lodging	55	2			57
Transportation	117	16	8		141
Computers	1				1
Coal	22				22
Hand/Machine Tools	105	15	14	7	141
Software	33		2		35
Entertainment	5				5
Trucking&Leasing	125	11	4	8	148
Telecommunications	20	1			21
Textiles	29				29
Iron/Steel	40	1			41
Aerospace/Defense	74				74
Chemicals	10				10
Total	**2700**	**161**	**72**	**37**	**2970**

Chi-square test

	Value	df	Sig. (2-tailed)
Pearson Chi-square	495.793	189	.000
Likelihood ratio	463.828	189	.000

		Value	Asymp. Std. dev.	Approx. T	Approx. Sig.
Lambda	Symmetric	.012	.002	5.544	.000
	Industry dependent	.013	.002	5.544	.000
	Cluster dependent	.000	.000	.	.
Goodman-Kruskal tau	Industry dependent	.005	.000		.000
	Cluster dependent	.092	.010		.000

	Value	Approx. Sig.
Phi	.408	.000
Cramer's V	.236	.000
Contingency coefficient	.378	.000

Cluster on variance – ANOVA table*

		Squared sum	df	Average squared error	F	Sig.
CATOAS99	Between groups	5.2508	3	1.7503	98.8274	0.00%
	Within groups	52.5639	2968	0.0177		
	Total	57.8147	2971			
EQTOAS99	Between groups	1.1575	3	0.3858	6.7449	0.02%
	Within groups	169.7760	2968	0.0572		
	Total	170.9335	2971			
LBTOAS99	Between groups	2.1116	3	0.7039	17.5043	0.00%
	Within groups	119.3466	2968	0.0402		
	Total	121.4582	2971			
TATOAS99	Between groups	3.3147	3	1.1049	20.3897	0.00%
	Within groups	160.5641	2963	0.0542		
	Total	163.8788	2966			
FXTOAS99	Between groups	5.1452	3	1.7151	32.0565	0.00%
	Within groups	158.7918	2968	0.0535		
	Total	163.9370	2971			
INTOAS99	Between groups	0.3213	3	0.1071	3.8849	0.88%
	Within groups	81.6846	2963	0.0276		
	Total	82.0059	2966			
CATOAS00	Between groups	7.4699	3	2.4900	140.2593	0.00%
	Within groups	52.6898	2968	0.0178		
	Total	60.1597	2971			
EQTOAS00	Between groups	1.9486	3	0.6495	11.2528	0.00%
	Within groups	171.3209	2968	0.0577		
	Total	173.2696	2971			
LBTOAS00	Between groups	2.1113	3	0.7038	18.8518	0.00%
	Within groups	110.7998	2968	0.0373		
	Total	112.9111	2971			
TATOAS00	Between groups	3.9027	3	1.3009	24.8480	0.00%
	Within groups	155.1258	2963	0.0524		
	Total	159.0285	2966			
FXTOAS00	Between groups	5.9629	3	1.9876	38.4795	0.00%
	Within groups	153.3093	2968	0.0517		
	Total	159.2721	2971			
INTOAS00	Between groups	0.2926	3	0.0975	3.4436	1.61%
	Within groups	83.9153	2963	0.0283		
	Total	84.2079	2966			
CATOAS01	Between groups	4.8350	3	1.6117	83.5800	0.00%
	Within groups	57.2312	2968	0.0193		

	Total	62.0661	2971			
EQTOAS01	Between groups	0.4976	3	0.1659	2.7748	4.00%
	Within groups	177.4326	2968	0.0598		
	Total	177.9302	2971			
LBTOAS01	Between groups	1.2227	3	0.4076	10.9871	0.00%
	Within groups	110.1019	2968	0.0371		
	Total	111.3246	2971			
TATOAS01	Between groups	3.0194	3	1.0065	18.8360	0.00%
	Within groups	158.3221	2963	0.0534		
	Total	161.3415	2966			
FXTOAS01	Between groups	5.1440	3	1.7147	32.4337	0.00%
	Within groups	156.9093	2968	0.0529		
	Total	162.0533	2971			
INTOAS01	Between groups	0.2706	3	0.0902	2.8940	3.41%
	Within groups	92.3602	2963	0.0312		
	Total	92.6308	2966			
LITOAS01	Between groups	0.0514	3	0.0171	3.0929	2.60%
	Within groups	16.4215	2963	0.0055		
	Total	16.4729	2966			
CATOAS02	Between groups	4.9179	3	1.6393	89.0429	0.00%
	Within groups	54.6416	2968	0.0184		
	Total	59.5595	2971			
EQTOAS02	Between groups	1.2302	3	0.4101	8.0868	0.00%
	Within groups	147.3054	2905	0.0507		
	Total	148.5355	2908			
LBTOAS02	Between groups	1.6895	3	0.5632	14.5706	0.00%
	Within groups	114.7149	2968	0.0387		
	Total	116.4044	2971			
TATOAS02	Between groups	3.8592	3	1.2864	24.0039	0.00%
	Within groups	158.7915	2963	0.0536		
	Total	162.6508	2966			
FXTOAS02	Between groups	6.3027	3	2.1009	39.5762	0.00%
	Within groups	157.5559	2968	0.0531		
	Total	163.8586	2971			
INTOAS02	Between groups	0.2792	3	0.0931	3.0686	2.69%
	Within groups	89.8702	2963	0.0303		
	Total	90.1494	2966			
LITOAS02	Between groups	0.0738	3	0.0246	4.4450	0.40%
	Within groups	16.3864	2961	0.0055		
	Total	16.4602	2964			
MVTOBV99	Between groups	19257.90	3	6419.30	1044.03	0.00%
	Within groups	18249.00	2968	6.1486		
	Total	37506.91	2971			
MVTOBV00	Between groups	13210.73	3	4403.58	681.09	0.00%
	Within groups	19189.44	2968	6.4654		
	Total	32400.17	2971			
MVTOBV01	Between groups	5808.46	3	1936.15	383.88	0.00%
	Within groups	14969.72	2968	5.0437		
	Total	20778.18	2971			
MVTOBV02	Between groups	1801.02	3	600.34	169.42	0.00%
	Within groups	10516.84	2968	3.5434		
	Total	12317.86	2971			

*Only elements of at least 5 percent significance

Cluster data showing significant differences (1 percentage level)

Cluster	1			2			3			4			Total		
	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.	Average	N	Std. dev.
CATOAS99	0.0908	2702	0.1222	0.2048	161	0.1978	0.2827	72	0.2464	0.2553	37	0.2145	0.1037	2972	0.1395
EQTOAS99	0.5047	2702	0.2288	0.5753	161	0.3130	0.5824	72	0.2856	0.4871	37	0.4374	0.5102	2972	0.2399
LBTOAS99	0.1921	2702	0.1961	0.0992	161	0.2152	0.0823	72	0.1873	0.1565	37	0.3937	0.1840	2972	0.2022
TATOAS99	0.3173	2697	0.2372	0.2145	161	0.1917	0.1747	72	0.1611	0.2046	37	0.1785	0.3069	2967	0.2351
FXTOAS99	0.3156	2702	0.2371	0.1813	161	0.1722	0.1529	72	0.1526	0.1649	37	0.1212	0.3025	2972	0.2349
INTOAS99	0.1638	2697	0.1678	0.1338	161	0.1517	0.1365	72	0.1430	0.0999	37	0.1301	0.1607	2967	0.1663
CATOAS00	0.0914	2702	0.1225	0.2214	161	0.1984	0.3121	72	0.2370	0.3197	37	0.2272	0.1066	2972	0.1423
EQTOAS00	0.5043	2702	0.2321	0.5752	161	0.3358	0.5964	72	0.2956	0.6426	37	0.2110	0.5121	2972	0.2415
LBTOAS00	0.1863	2702	0.1910	0.1070	161	0.2393	0.0986	72	0.1941	0.0443	37	0.1050	0.1781	2972	0.1949
TATOAS00	0.3076	2697	0.2340	0.1970	161	0.1789	0.1662	72	0.1559	0.1538	37	0.1285	0.2962	2967	0.2316
FXTOAS00	0.3053	2702	0.2339	0.1625	161	0.1583	0.1329	72	0.1310	0.1306	37	0.0863	0.2913	2972	0.2315
INTOAS00	0.1712	2697	0.1688	0.1437	161	0.1566	0.1569	72	0.1951	0.1018	37	0.1157	0.1684	2967	0.1685
CATOAS01	0.0995	2702	0.1307	0.2154	161	0.1887	0.2673	72	0.2437	0.2730	37	0.1816	0.1120	2972	0.1445
EQTOAS01	0.4980	2702	0.2339	0.5372	161	0.3305	0.5561	72	0.3454	0.5366	37	0.3211	0.5020	2972	0.2447
LBTOAS01	0.1890	2702	0.1888	0.1278	161	0.2358	0.1150	72	0.2166	0.0927	37	0.2136	0.1827	2972	0.1936
TATOAS01	0.3091	2697	0.2359	0.2124	161	0.1825	0.1774	72	0.1691	0.1860	37	0.1608	0.2991	2967	0.2332
FXTOAS01	0.3077	2702	0.2360	0.1774	161	0.1651	0.1412	72	0.1462	0.1501	37	0.1299	0.2947	2972	0.2335
INTOAS01	0.1809	2697	0.1747	0.1638	161	0.1847	0.2309	72	0.2335	0.1464	37	0.1472	0.1807	2967	0.1767
LITOAS01	0.0211	2697	0.0717	0.0350	161	0.1034	0.0365	72	0.0908	0.0360	37	0.0833	0.0224	2967	0.0745
CATOAS02	0.1061	2702	0.1286	0.2193	161	0.1835	0.2606	72	0.1992	0.3140	37	0.2234	0.1186	2972	0.1416
EQTOAS02	0.5124	2646	0.2215	0.5804	157	0.2619	0.5828	69	0.2612	0.6000	37	0.2502	0.5189	2909	0.2260
LBTOAS02	0.1829	2702	0.1952	0.0974	161	0.1895	0.1227	72	0.2711	0.0768	37	0.1518	0.1755	2972	0.1979
TATOAS02	0.3087	2697	0.2371	0.1981	161	0.1691	0.1604	72	0.1608	0.1724	37	0.1534	0.2974	2967	0.2342
FXTOAS02	0.3082	2702	0.2376	0.1585	161	0.1395	0.1361	72	0.1420	0.1286	37	0.1159	0.2937	2972	0.2348
INTOAS02	0.1745	2697	0.1716	0.1811	161	0.1939	0.2285	72	0.2254	0.1321	37	0.1539	0.1757	2967	0.1743
LITOAS02	0.0205	2695	0.0705	0.0396	161	0.1200	0.0246	72	0.0677	0.0440	37	0.1024	0.0220	2965	0.0745
MVTOBV99	2.2467	2702	1.8470	8.7452	161	4.6991	12.7130	72	6.1889	15.3228	37	8.7906	3.0151	2972	3.5531
MVTOBV00	2.0559	2702	1.7652	6.9525	161	5.1854	10.5362	72	6.5510	14.0409	37	9.7526	2.6758	2972	3.3023
MVTOBV01	2.0086	2702	1.6143	5.3159	161	4.0223	6.9056	72	6.3704	10.7253	37	8.2675	2.4149	2972	2.6446
MVTOBV02	1.8628	2702	1.4715	4.1927	161	3.3915	5.2737	72	5.6700	4.5313	37	3.8922	2.1048	2972	2.0362