

Chapter 1: Appearance of Knowledge Capital in Life of Enterprises

1.1. Shift between tangible and intangible assets

Within firms two processes can be observed simultaneously. 1. The share of those enterprises is falling, whose activity is mainly relying on material processes. The majority of enterprises are service enterprises, where the role of material processes are less determinant. 2. Parallel to it the structure of the uses of production factors is gradually shifting to the intangible or immaterial production factors. From the two processes the latter is more general, which can be observed also in case of production and commercial enterprises, not only at the service enterprises.

1.2. The knowledge companies

Around the second millennium more and more studies discussed a new type of firm, the so called knowledge companies. Those service enterprises are regarded as knowledge companies, whose assets are mainly intangible assets. This definition however can lead to faulty conclusions, whereas from the set of knowledge companies it excludes the non service enterprises. In reality that firm could be regarded as knowledge company, in which the share of intangible capital gets determinant and this is independent from whether a firm is dealing with production, commercial or service activity. So the knowledge company is not a new enterprise, but the future vision of existing enterprises.

1.3. The altering capital structure of knowledge enterprises

In market transactions the knowledge companies regularly were sold for higher value, as their book value. Therefore it became unavoidable to investigate, why the business value of knowledge firms is steadily higher as their book value. In

this phenomenon it comes to the surface that the book value comprises only the tangible assets and those intangible assets the accounting allows to book. The share of these assets is decreasing compared to the firm's further intangible assets. The firm value of enterprises realized on market above tangible assets recognizes the value of those further three intangible assets, which are not booked by the present accounting procedures and remain invisible below the surface. These are the customer capital, the organizational capital and the competency.

The *customer capital* includes relationships with customers and suppliers. It also encompasses brand names, trademarks, and the company's reputation or image. The *organizational capital* includes patents, concepts, models, computer and administrative systems, the firm's standardized processes or its processes operating on conventions and the enterprise culture. Employee *competence* involves the capacity to act in a wide variety of situations to create both tangible and intangible assets. These three capital items are living in the head of human beings and therefore we call them together as *knowledge capital*.

The knowledge capital is carried by human beings free in their personality, who cannot be expropriated or come into one's own like an estate or a machine. So it can easily occur that the investors, who would like to own their invested knowledge capital totally as their visible and invisible equity, in reality can own only its insignificant portion. To minimize the dangers of this situation the investors of the knowledge capital should solve serious strategic issues and the solution will be a mix of different strategies. One of them is very input intensive when the investor binds to himself the carriers of key competencies by a lot of obligations. These are the management contracts, the different severance payments, the golden parachute constructions, the loyalty deposits, etc. Because they are very expensive, the investors of knowledge capital start into an other direction as well, when they try to humanize the employment, being this a retaining value for the carriers of knowledge capital. Parallel to it they do not fear

to develop practices restraining the movement of employees within the firm and among firms.

But the investors of knowledge capital do have further possibilities. They focus their investments on the best expropriable knowledge capital forms. These are the customer and the organizational capitals. The competency is the kind of capital that is the hardest to expropriate. It is very dependent on personality and comprises many elements that are impossible to transfer. The investors do not develop the competency capital themselves. Instead they purchase it from the market. They give a higher return to its carrier he can achieve by himself. This way the obtained competency will be used for their own goals and from competency carriers they make employees by using both humanization or not rarely rude exploitation.

1.4. Development of knowledge capital

One of the biggest achievements of the knowledge era is that investors do not regard competency as a ready resource secured by the state's educational system, instead they know it is a resource that should be developed continuously. But it has enormous risks. Therefore the investors restrain themselves just from the development of competency. The risks related to it they attempt to share with the society, but mostly with the individuals owning the competency.

The development of knowledge capital does not start with the development of competency. This is logic. Who starts with the most risky things? The process starts with the capturing of the competency. That must be turned quickly into customer capital or organizational capital and the development of competency will be started only when the external sources of competency dry up or became very expensive. Therefore the number one mission of knowledge management is the capturing of competency and its turning into customer and organizational capital.

Because the competency does contain not only the expertise obtainable by education, but also comprises the practical skills, it cannot be obtained in the education organized by the state. The competency originates in the “learning by doing” process starting after the state organized education. The state organized education is only a precondition to this.

The employer decides voluntarily for competency development only if it is guaranteed that this competency is marketable only under his personal control or it cannot be used elsewhere.

If the competency to be developed cannot be expropriated then the firm taking upon the competency development first makes a market research. If the firm does not find the needed competency, then does not give competency, but it looks for an employee, who is able to obtain the competency. Then the employee by the help of the employer begins to develop his own competency. The employer will support the process only, when the competency creation is continuously enlarging the customer capital and the organizational capital as well. To secure it he will attempt to adopt the principles of the McKinsey pyramid.

1.5. What is the money invested into knowledge capital, investment or cost?

According to the current financial accounting regulations the majority of intangible investments into the human capital are not capital expenditures in accounting sense. These investments are costs according to accounting. As such, they need to be accounted for immediately and shown in the period when they are due, against net income if that same period. Exception is made only in case of goodwill: if immaterial assets are obtained through purchasing, e.g. their value gets market acknowledgement.

The cautious standpoint of accounting is understandable. It would like to allow only measuring solutions that deliver unique measuring results. The costs, results and ownership rights of intangible investments are remarkably uncertain. But this cautiousness does have a price. What is regarded as cost, does not create asset. So by the increasing weight of the knowledge capital the assets described by accounting will be smaller, because peculiarly the share of assets describable with great certainty will be smaller and smaller.

The magnitude of our real productive assets and the asset of enterprise could be described more accurate if we do not differentiate between material capital expenditures, immaterial capital expenditures regarded as capital expenditures according to accounting and the other, in their volume more significant immaterial capital expenditures. The money invested into human capital is capital expenditure and not cost. It creates working intangible assets in the future. Without controlling this process a modern company cannot be managed efficiently. By this approach also the real magnitude of our profit could be summed up better.

1.6. The impact of knowledge capital's appearance on enterprise strategy

If the decisive element of a company's asset is the knowledge capital, than this asset should be managed or developed adequately to this. Knowledge capital could be developed not only by separate increasing of individual knowledge capital stocks. In increasing of knowledge capital at least so important is the appropriate connection of the individual knowledge capital stocks. This is visualized by Karl Sveiby's three circle model. The model also gives help to describe the distortions in developing knowledge capital in Hungary. Many do focus only on relationship capital and neglect the competency or the organizational capital. At the same time the share of those in the Hungarian society is rather significant who neglect the role of their customers and in reality do not intend to the sound development of customer relationships.

1.7. The mission of knowledge management

In restricted interpretation the task of knowledge management is the spreading of competency elements within the firm, transforming them into customer and organizational capital and minimizing the risks of investments into knowledge capital.

The comprehensive understanding of knowledge management is based on the realization of the fact, that in the life of companies the knowledge capital will be decisive. Then the management should adapt himself to it, why the profit will come decisively from the management of knowledge capital. The assets must be recounted using new accounting principles. Not only the tangible assets must be measured, but all tangible and intangible together. It must be decided which tangible and intangible capital items should be developed to realize strategic goals. By appropriate programs the needed customer, organizational and competency capital must be developed. Later it each capital item should be developed consistently.

Development activities come to realization through actions where each action is a set of more narrowly interrelated projects. In the traditional world projects were regarded mainly as capital expenditure projects, the developments were identified as equivalents of capital expenditures. Today the tangible approach of projects is unsatisfactorily. It must be carefully reconsidered how big human capacity development is needed to a capacity development of a tangible asset, how big is its intangible capital expenditure requirement. The visible asset elements should be linked to the corresponding invisible asset elements. The appropriate groupings of invisible asset elements should be elaborated, responsible managers should be appointed for them, their responsibilities must be determined.

Chapter 2: The measurement of knowledge capital

2.1. Methods to determine knowledge capital

The knowledge assets could be determined with approximate accuracy, if from total assets we subtract the visible assets measured by the accounting and we add the real value of immaterial assets accounted within the visible assets. The real value of visible assets is unknown, but its magnitude can be deducted from the measurements of accounting. The very hard task is to determine the total assets.

There are two approaches to determine the total assets. The **share price method**, which revalues the book value of the enterprise using the shareholders' evaluation and from this tries to deduct the total market value of the firm, and the method of **discounted cash flows**, which deducts the firm's market value from the sum of its future discounted cash flows. The two methods should give the same results in normal cases.

Henceforth we review how to determine the total asset of the company, alias the firm value. The exposition will be not only theoretical. We try to confirm it by practical computations.

2.2 Determination of knowledge capital in case of RICHTER

2.2.1. The share price method

According to the share price method the business value is the sum of the equity at market value and the other liabilities at book value. The other liabilities at book value are given from the enterprise's balanced sheet. The

market value of equity could be estimated as a product of the number of shares and the market price of shares.

The results of computation are shown in case of RICHTER.

The growth of RICHTER's tangible capital is smooth, while its non tangible, immaterial capital is growing with more significant fluctuations. To its present level it arrived through more significant crisis. RICHTER's investments were drastically devalued by the so called Russian crisis in 1998. The trust of investors has begun to recover actually in 2003. The nominal reconstruction of firm value succeeded only in 2003. Parallel to it the knowledge capital was reduced in 1998 significantly. Its restoration was not easy and is still going on. After a significant decline 2003 has brought a very nice increase, but its 1997 magnitude did not return yet.

2.2.2. The method of discounted cash flows

For an investor it is never the most important, how much was invested into a firm's assets in the past. It is the most important, how much this company will bring to him in the future for his money, if he buys that firm today. His thinking is focused basically on the forecasted future and he tries to guess how much free cash will be produced by his company after having paid all expenditures necessary to its operation and its sound development.

In the centre of this thinking there is the money of free disposal, the so called "free cash flow". The free cash flow is equal to the enterprise's operating result after taxation, plus accounted costs that did not involve money outflows, minus capital expenditures invested into tangible assets or into other assets during its operation. This is an amount of money, that

will be produced by the firm's sustainable growth, that is not linked to any other liabilities and therefore could be the target of decisions about further uses, like consumption or investment.

How to guess the firm value of RICHTER in a given year by this method?

An external analyzer in a given fact year can rely on the annual reports of RICHTER in the given fact year and on the annual reports of the consequent fact years. So he is able to determine the fact free cash flows of RICHTER to each fact years. The firm value of RICHTER in the given fact year is equal to the produced free cash flow of the given year plus the free cash flows produced in the consequent fact years, but before summing up these items, the analyzer should take into account the time value of money, e.g. the free cash flows should be discounted to the given fact year. What still remains to be solved is the problem of residual value. The sequence of free cash flows to be summed up namely does not finish in the last fact year. It goes to the infinity. The residual value is nothing else than a perpetuity deducted from the free cash flow of the last fact year, that can be determined by a given discount rate and a valorization factor.

In case of RICHTER for the firm value we have got a similar result by the discounted cash flow method as by the share price method. One eye-catching difference is that the former method eliminates the "overshooting" effect so obvious in the formation of share prices.

2.2.3. The free cash flow and the capital structure

The determinant resources of free cash flow are the result and the depreciation. The free cash flow will be increased by these two items while the amount of capital expenditures decreases it. The result of RICHTER

has increased in spectacular way. On the contrary the growth of capital expenditures was much moderate. As a resultant the free cash flow had an impressive two and a half times growth. It looks like if RICHTER would have increased the efficiency of capital expenditures extraordinarily. From minimal increase in capital expenditures it achieved maximal increase in result and that has led to impressive growth in free cash flow. But this analysis remains within the traditional perspective as if RICHTER were only a production enterprise and its result were produced only by its invested tangible capital.

According to the valid accounting procedures a cost does not create asset. Earlier we argued in a detailed way that this is not the case. If a firm by a cost sacrifice obtains the confidence of customers, than it practically obtains an asset. The increment in customer capital leads to new revenues repeatedly. The same is true for research and development. If a new efficient procedure will be invented that allows the company be better organized, than a new asset will be created like by a capital expenditure into a machine: that will be an asset of organizational capital. Etc. What did the RICHTER do? It withhold its tangible capital expenditures and at the same time with high growth rate increased its “intangible capital investments”. The sales and marketing costs have grown quicker as the result. The R&D growth hardly remained behind them. So their average growth rate is quicker as that of the result. If we combine these two factors with the capital expenditures, they together got bigger in absolute level than the result and their growth rate is closely similar to the growth rate of the result.

2.3 The enterprise with the biggest knowledge capital - MATÁV

The growth of MATÁV's tangible capital has stopped. This break has appeared in investor's valuation as well. The investors followed MATÁV's investments with

confidence until 1999. By that time for MATÁV's shares were given significantly more than their book value. After 1999 this valuation has changed. From that time investors trust in MATÁV's investments less and less. This is shown in the fact, that the market price of shares is gradually approaching their book value. The same evaluation appears in the deviations between the market value and the book value of equity. These two categories are also approaching each other. The knowledge capital is correlating with their difference. This has been grown until 1999. After that it has been reduced by a magnitude. In the eye of the shareholders the knowledge capital of MATÁV has been devalued.

Shareholders know that behind MATÁV's results there is a very conflicting situation. While the firm's free cash flow and together with it its shares' market price are ailing, the most impressive Hungarian knowledge company performance also belongs to MATÁV. This appears in the performance of WESTEL, that is one of its LOBs. WESTEL is not on the stock market. So the share price method cannot be used in case of WESTEL. By the discounted cash flow method however the firm value of WESTEL can be estimated.

Paradoxical way this result raises further concerns. If the biggest Hungarian knowledge company is within MATÁV and its knowledge capital is bigger than MATÁV's one, than what is in the other LOBs?

2.4 Further examples – MOL, Shell, OTP

The Hungarian oil company has seemingly nothing to do with knowledge management. This is a tangible capital intensive and material intensive industry. It has nothing to do with knowledge companies. Before making immature conclusions let us see the figures. The share prices in case of MOL are also significantly higher than the book value of shares. This valuation strongly correlates with the valuations made by discounted cash flow method. This does

not prove, that MOL is not a knowledge company. With its 200 billion value the MOL's knowledge capital takes a rather exclusive place within the Hungarian knowledge capital and its development is a primary concern of the company.

While in case of MOL within the firm value to a 1000 billion HUF tangible capital 200 billion HUF knowledge capital is added, e.g. 20 percent, in case of SHELL within its firm value to a 100 million dollar tangible capital 400 million dollar knowledge capital is added, e.g. 400 percent. This is well showing the knowledge capital possibilities in material intensive and tangible capital intensive industries. Differently from the cases investigated earlier, in case of SHELL behind that 400 percent other capital items are to be found as well. SHELL does have immense explored oil reserves, but the company cannot book them among their assets according to accounting principles. So the SHELL's tangible assets due to the SHELL's tangible stocks are much higher than its assets in its books. The real knowledge capital of SHELL we could get if from the estimated firm value of SHELL we would subtract not only the tangible assets accounted in its books, but the non accountable tangible assets as well.

The estimations should be very cautious in cases of banks where the capital is mainly a loan, e.g. the capital of third parties. To get the knowledge capital here from the firm value determined by the share price method and the discounted cash flow method only the equity must be deducted.

2.5 National survey on the TOP100 sample

We computed the knowledge capital of those about 100 firms from the TOP200 list of Figyelő, whose data we could obtain from CSO (Central Statistical Office). From the TOP200 companies they represent 49 percent in turnover and 72 percent in equity. To guess the knowledge capital earlier we described two methods, the share price method and the discounted cash flow method. The share price method

naturally is applicable only in case of stock market companies. While in the Budapest stock market only data of 40 companies are useful for analysis and a lot from them are missing from our TOP100 sample we had to drop the usage of the share price method. For our knowledge capital estimates we could use only the discounted cash flow method.

What is the message of the computations? They definitely prove our previous statement that the transformation into knowledge companies is observable not only in case of so called knowledge companies, but is characteristic for the development of all companies. The knowledge capital is not a marginal phenomenon in the life of enterprises, but it has rather serious magnitude. At the same time the computations show if theoretically clean measurement principles will be applied in a distorted income distribution system, then the results also will be distorted. The knowledge capital measurements in a distorted income distribution system generate illogical knowledge capital measurements.

Our knowledge capital measurements will show knowledge capital only there, where income is produced. Where no sufficient income is produced or no income is produced at all, there according to the measurements remarkable knowledge capital does not exist. Do these results say, where measurable knowledge capital does not exist, there in reality no knowledge exists, the knowledge capital is missing or is this only an indication of the fact, that here no income is produced? These knowledge capital measurements reflect only the process of income generation and income redistribution but they do not represent a reliable national knowledge map.

What is the knowledge capital of an enterprise that cannot produce sufficient income and in the present income distribution system even does not have a chance to produce it? The knowledge capital in organizations is never negative. At least some bottlenecks make it immeasurable, but it exists and using further assumptions and methods it can be measured. To this we get appropriate starting

point and background by the analysis of the human capital expenditures invested into knowledge capital.

2.6. The decomposition of knowledge capital

While to develop knowledge capital is possible only in parts, it is not enough to measure only the total of knowledge capital. Their parts should be grasped as well. But this is more difficult, than to measure the whole. The main reason of the measurement difficulties relies in the fact that the market feedbacks, from we make conclusions about the magnitude of knowledge capital, relate to the whole of knowledge capital and they say nothing about its internal structure.

On the magnitude of parts one can conclude from the magnitude of money and time invested into the individual knowledge capital elements and from the measurement of efficiency of these investments. Their steps:

1. Separate analysis of capital items.
2. Building up desirable combinations and connections among capital items.
3. Measurement of money and time invested into creation of individual capital items.
4. Finally to measure by scorecard methods how the market and the environment evaluates the investments.

2.7 Practical experiments to measure intangible assets and revenues

In the past twenty years besides the above described two methods two further systems have shown remarkable results in giving answers to the above questions. The first is the **Intangible Asset Monitor** (IAM) evolved from a knowledge management base. The second one is the **Balanced ScoreCard** (BSC). From the

experiments measuring the invisible capital and its revenues the balanced scorecard is currently more popular.

Invisible assets are in most cases not measurable by a single indicator. They are measurable only with a set of indicators, as indeed is the quality itself. The measurement is very similar to the well-known torpedo game. When we do not know where the battleship is, we put signs on specific points of a squared paper field and from the feedback we receive, we draw conclusions about the location, shape and size of the target. The winner is the one who identifies the invisible battleship's position using the least attempts. The mentioned measuring systems are sets of indicators. With their help we try to observe and measure the magnitude and efficiency of intangible capital items and the changes among them.