Measurement of Humancapital
The employee future income method by Baruch Lev and Aba Schwartz

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Even though the great importance of the factor human capital has been recognised there is still no standard approach of measuring human capital. Accordingly a benchmarking tool needs to be developed to quantify human capital in companies.

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Introduction

Many annual reports of leading international companies include statements to human capital and imply that the employed people are the most valuable asset in the organisation.

These statements should be specified.

Unanswered questions are for example: Which value the personnel holds and which value based variances are traced on the labour? Which part of the profit is caused by the personnel?

It seems apparent that the employee of a company, who is defined as value driver to secure the business, holds inadequate significance (Stührenberg et al., 2003). Though the employee regibus sic stantibus comprises mostly underestimated influence on the shareholder value. Subsequently the value of the employee respectively the asset human capital has to increase to create value in the sense of value based management (Stührenberg, 2004).

BREISIG formulates: Profit is only achieved by efficient cooperation between tangible and intangible elements (human resources and capital equipment) in the context of an organization (Breisig, 1987).

Even though the great importance of the factor human capital has been recognised there is still no content approach of measuring human capital. Accordingly a benchmarking tool needs to be developed to quantify human capital in companies.

Aim of this paper is to present the approach developed by BARUCH LEV and ABA SCHWARTZ - which based on future income of employees - that facilitates the calculation of the value of human capital for individual companies. In relation to this aim the quantifiable values will be measured cardinally und monetarily (Kropp, 1979). Non monetary values, that build an eminent measure of value in theory and practice, will not be discussed because of the difficulties in evaluation. There are too many company external and internal factors that affect the staff.

It is essential to deliver a value that can be used as standard for entrepreneurial action following the goal of company evaluation which does not pursuit a 100% solution itself. JANSEN points out that the company value is dependent on the respective evaluation criterion / appraisal of business. Variations in the company value of 150% have been proven (Jansen, 2000).

The reader shall be sensitised for the value of human capital in organisations. The factor human being creates value and can not only be seen as cost driver in the profit and loss statement. In addition a corporation has to decide under consideration of the approach by LEV and SCHWARTZ if the investment in human capital is remunerative or if disinvestment is necessary.

Furthermore the paper contributes to the alliance of finance and controlling on the one side and human resource management on the other side. The perceptions are important for both business areas because one task of finance and controlling is to employ the financial resources profitably. Whereas the arising questions are the resulting costs that need to be monitored. The task of human capital management is to mobilise staff so that it serves the organisation’s goal. Therefore investments in personnel are necessary. In many cases new employees are needed to fulfil the company’s goal and these new staff members cause new cost. The area of conflict between optimal allocations of financial resources, cost cutting on the side of finance and urgently needed personnel from the human resource perspective is apparent. The quantification of human capital based on future income by LEV and SCHWARTZ on the issue can help in argumentation of the assignment of capital especially in times of cost cutting programmes.

This paper also features tools to supplement corporate and management accounting.

Relevance of Problem

Taking a look at current scientific publications on this topic it is noticeable that key ratios only consider the capital basis.

Many companies have realised that the know-how, potential and procedures of their employees determine the current and future value of the organisation. This is the origin for increasing the company value in the long run and to sustain this value for securing the business.

ZETTEL notices, that the organisational development of human resources is crucial to achieve an enhancement in value (Zettel, 1995).

Further RISAK points out in 1973, that even in fixed asset based organisations the relation between depreciation / interest and personnel expenditure is 1:1 (Risak, 1973). As a result personnel not only possess relevance in terms of costs but even more in terms of performance.

Central starting points are given by human resource accounting as well as management ratios, which only rely on capital; human resource aspects such as qualification, engagement and motivation of the staff is not to be found in balance sheets. Conventional value oriented key ratios shall be extended by personnel aspects.

It is to state that a changeover of staff to the competitor often leads to in-depth weakening of the company so that even the stock exchange rewards or sanctions the change (especially when managers are involved).

Accordingly a proactive management of human capital is necessary. The soft skills like abilities and behaviours become key factors of the business success.

RUMMLER and BRACHE make clear that measurement is the central tool for management. The following circumstances will not be achieved without clear quantification (Rummler and Brache, 1990).

- Communication of specific facts
- The knowledge about procedures in the company
- The identification, analysis and elimination of performance gaps
- Feedback that benchmarks the performance
- Perception and quantification of performance
- Support on decisions about allocation of resources as well as their planning

The results of the measurement have direct influence on application areas:

- Acquisitions (Due Diligence)
- Prearrangement of divesture / disinvestment
- Risk assessment (KonTraG)
- Credit assessment (Rating/Basel II)
- Accounting (US-GAAP, IFRS)
- Quality improvement (Certification and Business-Excellence)

A series of empiric findings show that the employee is of great importance for the company's success. SCHUSTER proved by an empirical census with more than 450 companies that there is a significant correlation (5% level) between financial success measured by net equity rate of return and the application of assessment centres, bonus programmes on labour efficiency, flexible compensation systems, targeted performance evaluations, organisational developments and flexible working systems (Schuster, 1986).

With an analysis of 3.452 companies HUSELID demonstrated a causal coherence between "Training on the Job" and performance oriented reimbursement related to the company's success (Huselid, 1993). The study of WELBOURNE and ANDREWS shows that companies introduced at the US stock exchange who comprised a mission statement and strategy distinguishing their staff as competitive advantage usually "survived" longer in the market than companies characterised as follows: no systematic staff training, no proactive personnel management and low level of full-time employees (Welbourne and Andrews, 1996).

LIKERT determines that the amount of human capital accounts for twenty times of a company's profit. Vice versa a reduction in human capital by 5% would be followed by zero profit for the organization (Likert, 1982).

The studies display that a quantification of the company's human capital takes an important stance, because the business success depends on their workforce. Therefore the question of quantifying these aspects must be raised.

In addition the globalisation as well as the trend from sellers market to buyers market contributes to a continual intensification of competition in almost all branches.

The competition in between producers results in short research and development periods for new products and new technologies. The changing environment and shifting demands of production and service directly affect the people. These changes force companies to align their employees to the new conditions.

The inter-industry structural transformation to the tertiary sector increases the importance of personnel intensive companies. Even today it is recognisable that human resources or the expenditure for human resources amounts for tendential higher shares than fixed assets in the profit and loss statements.

Another fundamental aspect is the shortage of the resource "human being". Continuous further training and re-education shall minimise this gap and companies have to invest in their staff to fulfil all needs (Fitz-enz, 2003).

Complex systems cause longer orientation times for member staff and this also accounts in rising expenditures.

Further on it is noticeable that the awareness of organisations about their social responsibility increased. This consciousness is expressed in voluntary statements and disclosures of social balances in addition to financial accounting.

So, it is a main task to evaluate the value of human capital to fulfil these requirements. One approach to measure the human capital of an organisation is the employees future income method.

Definition of Terminology

To ensure a common understanding of the subject the following path will identify and define the basic set of terms.

Company

The business in a free market economy is titled „company". The company is a historic manifestation of business. Every company is a business but not every business is a company characterises Woehe (Wöhe, 2002). According to Lohmann the commercially controlled company is subject matter of business economics (Lohmann, 1964). The company exists of:

- The factory as technical production area
- The business that takes over the task of "combining production and its purely internal company's processes with stream of payments and goods"
- The management as link between factory and business with the job to raise a business plan that determines the future business undertakings

For this dissertation the strict diversification of business and company will not be taken into account. Their differentiation is difficult and from an economic point of view – opposed to a legal perspective – this diversification by Lohmann may be neglected.

Personnel

Personnel are all persons currently working for a company. They are bound to the company by contract and cause personnel expenses e.g. wages and salaries. Early retirements, pensioner and former staff are not included in this definition (Wucknitz, 2002).

Value

According to the objective value theory the value of something may be determined by an objective scale in the sense that the nature of a commodity can be measured materialistic or non-materialistic. The value of a commodity is established by the pricing theory (Ott, 1970) for its objectively determinable usefulness of a commodity. The objective usefulness is called practical value. The production costs and the practical value decide the price of a commodity by offer and demand according to the objective value theory. This approach will not be followed in this work because its scientific discussion discovered weaknesses. Engels stated: The objective value theory is incorrect as empirical theory, because it is absolutely possible that two rationally acting and fully informed individuals choose differently (Engels, 1962).

The subjective value theory assumes a subject-object-relation (Böhm-Bawerk, 1921). The approach is based on the thought that the value amounts the usefulness. The value aggregates the usefulness that the commodity endows to the economic group (Heinen, 1976). By its subjective character the value is directly linked to the evaluator. Wegenast speaks out critically against the subjective value theory by raising objection with regard to the variability of the value finding. The central criticism is the subjectiveness meaning the personal interpretation of the usefulness (Wegenast, 1975). Engels reviews that the deciding weakness of the approach is that the value determining factors are not differentiated by potential subjective and objective elements but these are regarded as one unity (Engels, 1962). Koch notes that the problem of assessment only becomes relevant if the subjective element e.g. individual expectation on the benefit will be substituted by inter-subjective verifiable measurement categories (Koch, 1958).

Even though the subjective value theory is provided with critical aspects today economic science revert to this approach. It especially applies for the marginal utility theory (Pausenberger, 1962).

The first law of Gossen implies that the marginal utility for an arbitrarily divisible commodity decreases with increasing volume (Schneider, 1965). The value level of a commodity is measured by the importance of the exact necessity or part necessity which is the least important commodity covered by the available total reserve of this category (Böhm-Bawerk, 1921). Not the highest benefit of a commodity is controlling ... but the lowest benefit to which causation it would be rationally used in the exact economic situation. (Schneider, 1965)

The conclusions of the first laws of Gossen are the basis for value finding in monetary arbitration theory and serve as theoretic fundament for the value finding in this dissertation.

In accordance to Heinen the term value of a commodity is perceived as measure for its preference (Heinen, 1976). The priority in action taking is established by the value. Prices generate the real exchange ratio for the commodity in the marketplace (Sieben et al., 1976).

Value Sources

For the economic reality three value sources are determined. With these value sources the organisations generate their values:

- Investment Capital
- Customer Capital
- Human Capital

About 500 years ago Luca Paccioli developed rules in his "Summa de arithmetica" to evaluate assets and obligations. Since then a quantification of investment capital takes place explicitly and regularly. A comprehensive body of rules and regulations to determine the accrual income statement of a company originated on this foundation.

In the case of identifying customer capital – opposed to investment capital – the approach is determined causally. As an example the determination of the derivative goodwill shall be named here.

The quantification of human capital was initiated in the 70ies. The value of an employee was concluded by human resource accounting.

Human Capital

The term Human Capital mainly has been formed by the economist Schultz. He stated that traditional economic approaches did not consider the factor human being. He defined Human Capital as "...all human capabilities which (endorsement by the author) are inbred or acquired.

Each person is born with a genetic basic configuration which determines their inbred capabilities. ...the inbred quality of the population, if measurable, and the by investments acquired and increased quality of population is (endorsement by the author) defined as Human capital" (Schultz,1986).

In the following the term Human Capital shall be comprehended as the sum of achievement potential of the employees bound to the company by contract (Aschoff, 1978).

From a management stance the Human Capital constitutes of:

- Characteristics of the person that define how the person approaches its work, meaning energy, positive attitude, intelligence, reliability, and commitment;
- the learning aptitude, meaning Know-How and practical oriented thinking as well as vocation, imagination and creativity;
- their motivation to exchange information and knowledge, team spirit and target orientation.

It remains that Human Capital is the only economic factor that can generate values themselves (Fritz-enz, 2003).

By using the term asset for the achievement potential of the employee it is attempted to monetarily evaluate this potential.

Value Orientation

The term "value based Management" comes across in many economic journals when reading about "Controlling" and „Accounting". In addition many companies confess to "Value based management" in their annual reports. Still the term is not clearly defined yet (Streich, 2004).

The author understands value orientation as controlling measure to identify value driver within an organisation. The economic literature refers to a hierarchy of value driver. Value driver are the influence able factors that have relevant impact on the economic result of individual functions or processes. Their improvement resolves in a progression of the companies value. One of these influence able factors is the personnel of an organisation (Stührenberg et al. 2003).

But how is it possible to evaluate personnel?

Quantification of Human Capital based on Future Income

Lev and Schwartz, whom are the founders of this proposal, put forward to evaluate the human capital / human assets of an enterprise on the future income when acquiring human capital.

Referring to assets: Lev states that there are three categories of intangible assets – discovered intangibles, organization intangibles and human resources – which are fundamentally different.

His definition of a human resource asset commences with a declaration that companies spend money to affect employee knowledge and motivation, but that all such expenditures do not create assets. He contends that assets only arise when the benefits from such expenditures – in the form of increased employee productivity – exceed costs. (Lev and Schwartz, 2001).

With regard to accounting purposes – because the human capital itself and expenses for human capital are a material position with regard to accounting topics – it is important to think about accounting rules. Even the ownership and/or control issue from the asset definition still needs to be met.

Methodical Proceeding

Based on a statistical income development for various staff groups the average income expectations of the members is determined and discounted on the planning period. With deterministic the value of the human capital would be calculated (Lev and Schwartz, 1971):

$$HC_j = \sum_{t=j}^{T} \frac{I(t)}{(1+r)^{t-j}}$$

Formula 1: Calculation of human capital by using the expecting income

With:

HC_j = Human capital of j year old persons

I(t) = periodic-oriented income until the retirement age T

r = discount rate specific for the person

T = retirement age

Consequently, an exact measurement of the income is only possible ex post. Thus the periodic-oriented income is substituted by the estimated values. These are named I*(t). The estimated income profiles, that are conditioned by e.g. the education level, age, and development options of the employee, are marked $I^y(t)$. The function changes to:

$$I^*(t) = f(I^y(t))$$

With:

t= j,…T

The calculation of human capital is written:

$$HC_j^* = \sum_{t=j}^{T} \frac{I^*(t)}{(1+r)^{t-j}}$$

Formula 2: Adjusted calculation of human capital by using the expected income

Afterwards the disposition of the employee in the company is determined with the expected values. $P_j(t)$ shall express the likelihood that an j aged employee leaves the organisation for t years. For the expected value for human capital the formula states (Lev and Schwartz, 1971):

$$I(HC_j^*) = \sum_{t=j}^{T} P_j(t+1) \sum_{i=j}^{t} \frac{I^*(i)}{(1+r)^{t-j}}$$

Formula 3: Calculation of human capital by using the expecting income and consideration of probabilities

FLAMHOLTZ states critically that the approach of LEV and SCHWARZ implies the assumption that the employee remains in the company until their retirement (Flamholtz, 1972.

This is eliminated by SADAN and AUERBACH. They expand the approach by changing P(t) into the probability that the employee leaves the organisation after t periods. Accordingly the human capital is calculated by (Sadan and Auerbach, 1974):

$$I(HC) = \sum_{t=1}^{S_{\max}} P(t) \times \sum_{i=1}^{t} \frac{W(i)}{(1+r)^{i-1}}$$

Formula 4: Adjusted calculation of human capital by using the expecting income and consideration of probabilities

With:

W = Wages and Salaries of the specific company

S_{max} = maximum possible seniority

The value of one employee is calculated by the product of the cash values of his discounted personnel expenses and the individually determined weighted seniority. The sum of the single values of each employee is the value for the entire organisation.

Critical Assessment

The allocation of employees into groups is generally difficult. Further the statistically determined values for the employment groups are only limited usable for company specific evaluations. The future salaries of an employee do not necessarily reflect the value of the person in the organisation.

Regarding the discount rate and the probability factor the question must be raised about the "correct" company individual determination. Also the provision for education and training as well as other human resource activities are not judged at all. The internal exchange of employees has been ignored. Group dynamic effects are not accounted in the calculation of the total human capital (Freiling, 1978).

Form a practical point of view it might be helpful to forecast each employee's cost to company and discounted back separately. Thus a separate database comprising compensation details, age and experience details, historical promotion pattern for each employee should be constructed. The database serves as a powerful MIS tool for value interpretation.

The growth rate of earnings of each employee till retirement should be determined for projecting the employee's cost to company after looking into the company's compounded annual growth in employee's cost to company for different employee classes, global industry trends for the future (e.g., what happens after 5 years when the demand for jobs in the software sector obliterates), and sustainable growth rates for the next 25-30 years given the nominal interest rates of the Indian economy.

The attrition rates for the company / industry should not be considered as a deduction factor, as the employees who leave the company will be replaced by others to maintain the level of operations, and thereby the employee strength remains unchanged (conservation of employee stock / inventory). This is also consistent with the going concern concept.

Regarding the discounting rate it might be necessary to use the weighted cost of capital as discounting rate.

Conclusion and Outlook

The aim of this paper was to present an approach to evaluate the human capital of a company. This approach shall enable organisations to determine the value of human capital.

The discussions related to practice reveal that it is possible to measure human capital even though the theoreticians often question the practical use of these methods. They are very good at pointing out the problems and what is wrong, but they don't offer any solution. So, the reason for negating the approach of human capital evaluation by the theoreticians could be the apprehension of categorised thinking of „right and wrong". Surely no single method can claim to be the right capital value calculation (Streich, 2006). But if we already negate human capital evaluation at this stage many other theories like for example the discounted cash flow method and the scenario analysis must be questioned. In my point of view it is essential and strongly recommended to show and present the value of human capital in financial statement. I am sure that the development, outworking and application of a recognised approach to measure the human capital of an organization is only a matter of time.

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Case Study

The following spreadsheet describes the calculation with an innuendo of 10% discounting rate and considering the fluctuation of staff. First the employees are categorised by qualification and age.

Categorisation of Employees

Age of empl.	number of low skilled empl.	number of middle skilled empl.	number of high potentials	sum
25-34	500	10	10	520
35-44	200	20	10	230
45-54	0	30	10	40
55-64	0	0	10	10
Sum	**700**	**60**	**40**	**800**

Figure 1: Categorisation of employees, obtained form Persch 2003.

Afterwards the annual salaries are identified under reflection of the age groups.

Group specific Wages and Salaries

Age of empl.	low skilled empl.	middle skilled empl.	high potentials	sum
	Wages and Salaries in Euro	Wages and Salaries in Euro	Wages and Salaries in Euro	Wages and Salaries in Euro
25-34	20.000	25.000	40.000	85.000
35-44	25.000	30.000	45.000	100.000
45-54	30.000	35.000	50.000	115.000
55-64	35.000	40.000	55.000	130.000
Sum	**110.000**	**130.000**	**190.000**	**430.000**

Figure 2: Group specific wages and salaries, obtained form Persch 2003

In a final step the cash values of the staff members and the annual salaries per age group is established. The cash values are summed up to obtain the value of the entire human capital (196.709.587 Euro).

Value of Human Capital

Age of empl.	low skilled empl.	middle skilled empl.	high potentials	sum
	NPV of Wages and Salaries in Euro p.a.	NPV of Wages and Salaries in Euro p.a.	NPV of Wages and Salaries in Euro p.a.	NPV of Wages and Salaries in Euro p.a.
25-34	110.920.774	2.707.368	4.174.226	117.802.368
35-44	51.330.270	6.075.718	4.451.896	61.857.884
45-54	0	9.294.591	4.375.232	13.669.823
55-64	0	0	3.379.512	3.379.512
Sum	**162.251.044**	**18.077.677**	**16.380.866**	**196.709.587**

Figure 1: Value of human capital by using the future income method, obtained form Persch 2003