

## HUMAN CAPITAL ACCOUNTING – MEASUREMENT MODELS

Pedro Andrade<sup>1</sup> and Ana Maria Sotomayor<sup>2</sup>

<sup>1</sup> Higher Institute of Accounting and Administration of Lisbon, Email: pn.andrade@netcabo.pt

<sup>2</sup> Higher Institute of Accounting and Administration of Lisbon, Email: amssotomayor@hotmail.com

---

### ABSTRACT

*For the American Accounting Association (AAA) human capital accounting (HCA) is the process of identifying and measuring data about human resources and communicating this information to interested parties. Will the data on the measurement of human resources that this article focuses, seeking to provide the existing measurement models, thus allowing the existence of means for making decisions, monitor the effective use of human assets and determine the value of people to organizations.*

**Keywords:** Human capital, human capital accounting and measurement of human capital.

---

### 1. INTRODUCTION

Corporate management has long been suggested that employees are a valuable resource. However, it has been given little relevance to the measurement of the cost or value of human resources in the organization. Economists were the first group to show interest in the measurement area of human resources. The thrust of recent work on human capital in the economy has been towards the quantification of human resources at the macro level and not from the standpoint of the individual or company. The interest has been focused on particular aspects of human capital, as investments in education and health care. During the early and mid 1960, shortly after economists show an interest in human capital, some accountants were concerned about the potential impact of ignoring such an important resource and human capital in financial decision making, and this concern led to the development of a new field of research in accounting called human resource accounting (HRA) or human capital accounting (HCA).

According to AAA (1973) HCA is the objective of improving the quality of financial decisions taken both internally and externally on an organization. With regard to internal decisions, HCA data should allow an improvement in decision making when considering a larger set of variables. Usually the internal decision making ignores the impact of human resources in both the short and long term, or at best, sees human resources on a subjective rather than a quantitative basis. The availability of quantitative data on human resources should allow its impact to be easily incorporated in the decision-making. This is particularly relevant when it comes to making decisions on the budget. The development of a HCA system should provide the data needed to convert aspects "quality" of decision making inherent to human resources management tool in a slightly more quantitative. External users, especially investors, could benefit from the HCA through the provision of information about the degree to which the organization's human capital was increased or decreased during the period.

To Flamholtz (1974) and McRae (1974) one of the fundamental objectives of the HCA is to develop methods of measuring human resource cost and value. These measurements are intended to provide a means for making decisions involving the recruitment, development, compensation and replacement of human resources on a "value for money." They are intended to enable the management monitor the effective use of human asset management, and assess the extent to which management was appreciated, preserved, or human resources were exhausted. Another key objective of HCA is to develop a theory explaining the nature and determinants of the

value of people to organizations. This theory serves a dual purpose. First, it allows to identify the variables that must be considered in the development of measures (monetary and non monetary) value of human resources. Second, the theory may eventually become the basis for a new paradigm of human resource management.

## 2. ACCOUNTING MEASUREMENT OF HUMAN CAPITAL

### 2.1. Introduction

One can define three types of measurement models for the Human Capital Accounting (HCA) (Bontis *et al.*, 1999; Sackmann *et al.*, 1989):

- Cost models that consider the historical cost of acquisition, replacement and opportunity;
- Value models that combine human resource behavior with non-monetary economic models of monetary value;
- Emphasis on monetary models that calculate discounted estimates of future income or wages.

### 2.2. Methodologies and Models for Measuring

The accounting system uses the concept of cost in several ways, including the historical cost, disbursement, replacement, current, direct, indirect, standard, fixed, variable, opportunity to quote someone, but the most common ways in which term cost is used.

Defining formally, a cost is incurred sacrifice to get some benefit or service provided. A cost may be incurred in the acquisition of physical assets or intangible benefits. Conceptually, all costs are components of expenditure and assets. Conventionally defined, a portion of the expense is a cost that was consumed during the current accounting period. An asset is the portion of costs that may be expected to generate economic benefits in future accounting periods. The fundamental problem of accounting is the measurement of the part relating to expenditures and activities which constitute a component of cost. It appears that the notion of cost of human resources is derived from the general concept of cost. Therefore, human resources costs are the sacrifices incurred for hire or replace people. It is found that can be composed of costs and disbursement of opportunity, and can be direct or indirect. In addition, it appears that it is possible to account for the standard cost of human resources, as well as the actual cost, and that the conventional accounting concepts of cost and replacement also have counterparts in the HCA.

When it comes to measures of value, the focus is quite different from cost. The measurement of costs and its definition involves the accumulation of them. This represents a historical process. The value is oriented to the future not the past. Thus, a technique for measuring the required projections and is, in turn, inherently uncertain.

Looking for information on value, Flamholtz (1999: 159) says:

“Despite its many applications, the concept of value has essentially two different meanings. It expressed the usefulness of a particular resource the power of purchasing goods which possession of that resource facilitates. In other words, one type of value is utility and the other is purchasing power. The former is termed “value in use” or “use value”, and the latter is termed “value in exchange” or “exchange value”. All economic theories of value are based explicitly on the premise that the attribute determining whether and to what extent an object possesses value is the perceived ability to render future economic utility benefits or services.

Also according Flamholtz (1999: 160):

“If an object is not capable of rendering future economic services, it has no value. In these terms, an object’s value is typically defined as the present worth of the services it is anticipated to render in the future.”

#### 2.2.1. Measuring the Cost of the Original Human Capital

We found that the original cost of human resources or accounting refers to the sacrifice that was incurred to select, hire and develop people. This notion is similar to the concept of original cost for other assets. For example, the original cost of plant and equipment is the sacrifice incurred to acquire these resources. We note that the original cost of human resources including recruitment costs, selection, hiring, placement, orientation and training in the service, and that some of these items are direct costs, while others are indirect. For example, the cost of the salary of an intern is a direct cost of training, while the use of the time a supervisor during training is an indirect cost. The need to add these costs will influence their components. For management purposes it is desirable to include the opportunity costs incurred in the original cost of human resources.

However, because often there are difficulties involved in measuring the opportunity costs, may not be possible to obtain clear estimates. To meet external reporting, this method would make HCA consistent with the accounting of other costs.

The definitions given by Flamholtz (1999) on the costs identified in their model are:

- **Hiring costs:** refer to the sacrifice that entailed hiring a new head for the role. They include all direct costs of training, selection, recruitment and placement as well as certain indirect costs.
- **Recruitment costs:** are those incurred to identify sources of human resources, including those within and outside an organization. These costs are also incurred to attract prospective employees of an organization.
- **Selection costs:** are those incurred for determining who should be devoted to employment. They include all costs incurred in the selection of persons to be members of an organization.
- **Recruitment and placement costs:** are incurred to bring an individual to an organization and put it in service.
- **Learning costs:** refer to the sacrifice that must be incurred to train a person and bring it to the level of performance normally expected of an individual in a given position.
- **Costs of formal training and guidance:** they are associated with formal education and training.
- **Training costs at work:** are generated during the formation of an individual in the workplace, instead of using formal training programs.
- **Lost productivity during training:** the cost of the lost performance of others who do not form during the training period.

### 2.2.2. Measurement Replacement Cost of Human Capital

We found that the replacement cost of human resources refers to the sacrifice that today would have been incurred to replace the human resources currently employed. For example, if an individual leaves the organization, would generate costs to recruit, select and train a replacement. The replacement cost of human resources includes the costs attributable to the rotation of a current employee, as well as the costs of hiring and developing a replacement. Includes direct and indirect costs. Since replacement costs are used by management, they should include components of opportunity cost and expense. This perspective suggests that there is a dual notion of replacement cost: positional and personal. In this context, positional replacement cost refers to the sacrifice that had to be incurred today to replace a person currently employed by a replacement capable of providing an equivalent set of services in the same position. Refers to the cost of replacing the set of services required of any employee in a specific position.

There are three basic elements of positional replacement cost, hiring costs, training costs and severance costs. The first two of these costs have already been discussed above, the third is considered here.

The concept of cost used in the model Flamholtz (1999) implies:

- **Severance costs:** are incurred as a result of a particular post holder leaves the company.
- **Replacement cost:** refers to the act of replacing one person by another functionally equivalent.

### 2.2.3. Measured at Historical Cost of Hiring Human Capital

In the model suggested by Flamholtz (1999) the historical cost method, or contract, is to capitalize all costs associated with recruiting, selection, hiring and training and amortize these costs within the projected life of the asset.

There are several limitations of such measures. Thus, the economic value of an active human does not necessarily correspond to its historical cost. On the other hand, any appreciation or depreciation may be subjective, with no relationship to any increase or decrease in the productivity of human assets. Finally, the costs associated with recruitment, selection, hiring, training, placement and development of employees might differ from one individual to another within a company. Soon, the historical cost does not result in comparable values of human resources.

### 2.2.4. Lev and Schwartz Model

The Lev and Schwartz model (1971) aims to determine the value of human capital associated with an organization. The dichotomy in accounting between human and nonhuman capital is critical to the present authors.

According to Lev and Schwartz (1971) Irving Fisher, one of the founders of the theory of human capital, human capital does not distinguish non-human capital. However, to Lev and Schwartz (1971) there is a fundamental difference between the two types of capital: the ownership of human capital is transferable (not a society of slavery), while human capital is not traded in the market. In a context of certainty, this distinction has no impact in determining the value of capital, since it is understood that there is a perfect knowledge of future income, as well as the discount rate. In a context of uncertainty, it no longer applies. However, for non-human capital (physical capital) we can infer its value by the observation of market values that reflect the present value of

future outcomes for the parties dealing in the market. But for the human capital we can not do the same because it is not traded in the market. Thus, the authors conclude that in a world of uncertainty, there is an important distinction between human and nonhuman capital.

For this they propose that the value of human capital is determined as follows:

1. All employees are classified into specific groups according to their age and skills;
2. The average annual compensation is determined for different age groups;
3. The calculation of total compensation that each group mentioned in point 2. will be up to retirement age;
4. The total remuneration will be calculated at a rate discounted cost of capital. The value arrived at will be the value of the asset / human capital;

According to this model, the formula to calculate the expected value of human capital of an employee is as follows:

$$E(V_{\tau,\cdot}) = \sum_{t=\tau}^T P_{\tau}(t+1) \sum_{i=\tau}^t \frac{I_i}{(1+r)^{t-i}}$$

Where,

$E(V_{\tau,\cdot})$  = The human capital value of a person with  $\tau$  years old;

$I_i$  = The person's annual earnings up to retirement. These values are plotted through the profiles of income;

$r$  = Discount rate specific to the person;

$t$  = Retirement age;

$P_{\tau}(t)$  = Conditional probability of an elderly person  $\tau$  to die in year  $t$ .

The value of the organization's human capital is no more than the sum of the values of human capital of individuals working in the organization.

According to Lev and Schwartz (1971) even though nothing has been done in accounting to include this item in financial reporting, economic theory provides a basis for a practical solution of the problem.

The main disadvantages are:

1. This model implies that the condition for future work the employee does not change with the time of his professional life, but will remain the same in this;
2. The approach does not take into account the possibility of a worker to withdraw from the organization before his death or retirement. As such, it is unrealistic;
3. Ignores the variable of career movement of workers within the organization;
4. It does not take into account the changes in the functions of workers.

On the other hand, this method does not give the correct value of human capital, and not measure their contributions to achieving organizational effectiveness.

### 2.2.5. Stochastic Model of Eric Flamholtz

This model was suggested by Flamholtz (1972). It is an improvement of the "present value of future earnings model" of Lev and Schwartz (1971), since it takes into account the possibility or probability or the movement of an employee of one function to another in his career and also his departure from the company beforehand, i.e., death or retirement.

According to this model, the ultimate measure of the value of an individual to an organization is its expected value of achievement. The expected value of achievement is based on the assumption that there is no direct relationship between the cost incurred by an individual and its value to the organization at a particular point in time. The value of an individual to the organization can be defined as the present value of all future services that is expected to provide during the period that remains in the organization. According to the author, you can not predict with certainty the amount of service expected of an individual at a given point in time. Therefore, we resort to probabilities.

So we have:

$$E(S) = \sum_{i=1}^n S_i P(S_i) \quad (2.2.5. -1)$$

$$E(S) = S_1 P(S_1) + S_2 P(S_2) + S_3 P(S_3) \quad (2.2.5. -2)$$

where  $S_i$  represents the amount of service you would expect in each state and  $P(S_i)$  is the probability of them being obtained.

Flamholtz formulated the variables that affect the expected value of an individual  $[E(CV)]$ : conditional value individual's probability of staying in the organization. The first is a function of the individual's skills and level of activity, while the latter is a function of variables such as job satisfaction, commitment, motivation and other factors.

The  $[E(CV)]$  of an individual can be defined as (Flamholtz, 1999):

$$E(CV) = \sum_{t=\gamma}^T \frac{E(CV)_t}{(1+i)^{t-\gamma}} = \sum_{t=\gamma}^T \frac{\sum_{j=1}^{m-1} V_{jt} P(V_{jt})}{(1+i)^{t-\gamma}} \quad (2.2.5. -3)$$

Where:

$$P(V_{jt}) = \frac{P(V_{jt})}{\sum_{j=1}^{m-1} P(V_{jt})} \quad (2.2.5. -4)$$

$E(CV)$  é expected conditional value t;

$V_{jt}$  is the value of the service state j in period t;

$P(V_{jt})$  is the probability of obtaining the value of the service state j in period t, where the odds are transformed as the expression (2.2.5.-4);

$(V_{jt})$  is the probability of obtaining the value of the service state j in period t;

$(1+i)^{t-\gamma}$  is the discount rate, where i= interest rate; t is the time since  $\gamma$ ;

Expected realizable value in period t of an individual can be defined as (Flamholtz, 1999):

$$E(RV) = \sum_{t=\gamma}^T \frac{\sum_{j=1}^M V_{jt} P(V_{jt})}{(1+i)^{t-\gamma}} \quad (2.2.5. -5)$$

Where,

$E(RV)$  is the expected realizable value in period t;

$V_{jt} = 0$  (m is the exit status).

The model suggests a four-step approach, namely:

1. Determination of the period for which a person is expected to serve the organization.
2. Identification of "state service" (ie function) that the employee could take up during his career, including the possibility of leaving the organization.
3. Estimated value obtained by the organization when a person occupies a certain position. This value can be determined either by multiplying the price of services with the amount of services to be rendered or expected income derived from services to be provided.
4. Determine the total value of services derived by different employees or groups of employees to the organization. The value is discounted to reach a predetermined rate for the current value of human resources.

As limitations, the model suffers from all the drawbacks of the present value of future earnings models. Moreover, it is difficult to obtain reliable data to determine the value obtained by an organization during the period in which a person occupies a particular position. The model also ignores the fact that individuals who operate in a group may have a higher value for the organization, compared to individuals working independently. In the analysis of operational capability, the approach falls short of practical value to the extent that the odds have to be determined for each individual occupying various states of service and these probabilities must be determined for all periods 'n' employees to a individual basis. It will also be very costly and time consuming to predict the movements of output probabilities career or an individual basis. The data prepared on this basis can involve large variances that reduce the usefulness of the model.

### 2.2.6. Morse Model

In the approach suggested by Morse (1973), the value of human resources is equivalent to the present value of net benefits obtained by the service organization of its employees. The method involves the following steps:

1. Determine the gross value of services to be provided by employees in the future, based on their individual and collective capabilities.
2. Determine the value of future payments (direct and indirect) for employees.
3. Determine the excess of the future value of human resources (as in 1.). On the value of future payments (as in 2.). This represents the net benefit to the organization's account of human resources.
4. The present value of net benefit is determined by applying a discount rate pre-determined (usually the cost of capital). This amount represents the value of human resources for the organization.

Morse (1973) cites Flamholtz (1971) concerning the measurement of the value of the individual to be an essential element for all the work of the HCA. According Ogan (1976), expands the notion of Morse Flamholtz. Conceptually, Morse (1973) states that the value of human assets (human resources) to an organization is equal to the current value of the services hired by the organization for its employees. In a context of certainty, this may be expressed as follows:

$$A = \sum_{i=1}^N \int_y^T \frac{I_i(t)}{(1+r)^{t-y}} dt + \int_y^T \frac{X(t)}{(1+r)^{t-y}} dt \quad (2.2.6.-1)$$

where:

A = value of human assets to a formal organization;

N = number of individuals currently employed by the organization;

y = current time;

T = highest time at which an individual currently employed leaves the organization;

$I_i(t)$  = net value of the services rendered by individual  $i$  at time  $t$  to the organization,  $I_i(t) = G_i(t) - E_i(t)$ ;

$G_i(t)$  = gross value of services rendered by individual  $i$  at time  $t$  to the organization;

$E_i(t)$  = all direct and indirect compensation given individual  $i$  at time  $t$  by the organization;

$X(t)$  = value of the services of all individuals currently employed working together in excess of the value of their individual services at time  $t$ ;

r = time value of money.

For Morse (1973) the first part of equation (2.2.6.-1) represents the valuation of the individuals to the organization. The second part refers to the added value of employees to the organization, which is derived from the ability to work in a team.

The author says that, given the assumption behind the equation is the context of certainty, the equation is not operational. Moreover, as worries about the organization at the time y (present time), if the organization to hire more staff or make the costs of training of employees, the value of human activities (human resource) may change due to changes in  $I(t)$  and / or  $X(t)$ .

The author refers to the work of Lev and Schwartz (1971), in which these authors attempt to apply the economic concept of human capital to HCA. In this sense, the value of human capital of a person when y is the present value of future earnings resulting from employment, and the sum of these present values is the total amount of human capital associated with an organization. In a context of certainty the value of human capital employed in an organization when y is:

$$C = \sum_{i=1}^N \int_y^T \frac{E_i(t)}{(1+r)^{t-y}} dt \quad (2.2.6.-2)$$

where C = value of human capital employed in na organization.

According to Morse (1973), Lev and Schwartz said the report of the value of human capital will provide users of financial information important data on changes in manpower of the organization, but do not indicate whether there is a direct relationship between the value of human capital and the value of the person for the organization.

For Morse (1973), the concept of human asset and human capital represented by equations (2.2.6.-1) and (2.2.6.-2), respectively, are not alternative ways of seeing the human resources are complementary. Each one represents the present value of a share of gross value, given by employees to an organization.

Thus, one can obtain a third equation:

$$A = \sum_{i=1}^N \int_0^T \frac{G_i(t)}{(1+r)^{t-\gamma}} dt + \int_0^T \frac{X(t)}{(1+r)^{t-\gamma}} dt - \int_0^T \frac{E_i(t)}{(1+r)^{t-\gamma}} dt \quad (2.2.6.-3)$$

The third installment of the equation (2.2.6.-3) represents the value of human capital currently employed in the organization. The first two plots represent the present value of gross services assigned to the organization, for all existing employees.

If you want to disclose the value of human resources in a financial statement, according to the theory of ownership, only the net value of human assets can be shown. Because this theory is mainly concerned to disclose the interests of the owners of liquids organization. Thus, this theory is an asset of value to the organization only when it is valuable to the owners of the organization.

### 2.2.7. Lev and Friedman Model

According to Friedman and Lev (1974), the value of human resources consist of the value of the discounted stream of wage differences between the market and those charged by the company, ie the difference between what should be paid to employees if the personnel policies were identical to the company in an industry where it operates and what will actually be paid due to the specific policies of the company.

The approach of measurement of investments in the company's human resources proposed by Friedman and Lev (1974) is based on generally accepted concepts of asset valuation, but goes beyond the more usual accounting practices, by incorporating in the process of measuring both the current value as the market value.

In terms of accounting records, Friedman and Lev (1974) propose the existence of an account "Investments in Human Resources", where the difference between the external and internal human resource is registered.

### 2.2.8. Hermanson Model

Hermanson (1964) is considered to be the first to address the issue of HCA. Hermanson presents the issue of HCA as being something that has to do with the balance (Roslender and Dyson, 1992).

To Hermanson (1964) there is an appropriate definition of an asset. Second it is necessary to arrive at a definition of an asset that allows the inclusion of features that are present in the company, but are not necessarily owned by it. Thus, Hermanson (1964: 4) defines the asset as follows:

"The assets are scarce resources (defined as services but grouped by and relating to agents) operating within the entity, capable of being transferred by the forces in the economy, and expressed in monetary terms that can be acquired as a result of current or past, which apparently has the ability to provide future economic benefits."

The advantages of inclusion of human resources in the financial statements, the author argues that:

1. Its inclusion will increase the comparability and completeness of financial statements, result-ing in a more efficient allocation of resources in the economy;
2. A rejuvenation of the financial position;
3. A closer relationship between the financial statements;
4. A helping hand for the analysis of companies in terms of internal.

Hermanson (1964) identifies two methods of assessment of the operating assets: the method of non-purchased goodwill and the method of the adjusted present value.

#### 2.2.8.1. The Method of Non-Purchased Goodwill

This theoretical model assumes that the value of operating assets must equal the present value of future services that these resources can provide. Such an assessment requires, however, to estimate the net in order to identify the portion of income that is attributable to operating assets.

To calculate the amounts relating to human resources, Hermanson (1964) begins by considering the three variables in the economy, particularly at the level of business activity. They are: the average value of assets held, the result after tax and return on assets. With these variables to reach profitability in the sector of activity, which includes the company that seeks to enhance human resources.

Hermanson suggests that, at the end of each financial year, in the case of the positive differential would record a charge in operating assets account for under equity by the amount of capital held that would be obtained if you apply a normal return. For the negative spread, we reverse the situa-tion. In each financial year would make these calculations in order to update the value of operating assets, which in view of Hermanson consist primarily

in human resources. The launch to do would be deleted from the register of the previous year and the launch of this year.

### 2.2.8.2. The Method of the Adjusted Present Value

This method uses a weighted average of the last five years of performance, to modify the present value (discounted at the rate of return of the economy last year) wages expected to be paid over the next five years.

The method begins by calculating the present value of wages that are estimated to pay over the next five years. Then you need to calculate what Hermanson calls the efficiency ratio that is given by the following equation:

$$\text{Efficiency ratio} = 5 \left( \frac{R_{f_0}}{R_{s_0}} \right) + 4 \left( \frac{R_{f_1}}{R_{s_1}} \right) + 3 \left( \frac{R_{f_2}}{R_{s_2}} \right) + 2 \left( \frac{R_{f_3}}{R_{s_3}} \right) + \left( \frac{R_{f_4}}{R_{s_4}} \right)$$

where,

$R_{f_p}$  rate of accounting income on owned assets for firm for current year;

$R_{s_a}$  average rate of accounting income on owned assets for all firms in economy for current year;

$R_{f_f}$  rate of accounting income on owned assets for firm for fourth year previous;

$R_{s_y}$  average rate of accounting income on owned assets for all firms in economy for fourth year previous.

If a given company earn exactly the return that on average all firms in the economy gained each year, the efficiency ratio would equal one. Alternatively, if the resources were more efficient than an average, the ratio would exceed one and in case of below average, less than one.

The next step is to multiply the present value of payments to the human resources efficiency ratio. Hermanson said the preferred method goodwill is not purchased.

Hermanson believes that the attempt to enhance the human resources should be made in the annual financial statement and not on its own. Hence his emphasis on balance.

### 2.2.9. Hekimian and Jones Model

Hekimian and Jones (1967) proposed the opportunity cost method to overcome the limitations of the method of replacement cost. These authors suggested that the value of human resources is established through a bidding process within the company, based on the concept of opportunity cost. With this method, those in charge make a sort of bid to recruit the employees they need.

It identifies several limitations on the use of the opportunity cost method. First, the inclusion of only those employees selected on the basis of the assets may be interpreted as discriminatory by other employees. Second, the less profitable divisions may be punished for their incompetence. Third, the method can be evaluated as artificial by those who do not accept.

### 2.2.10. Ogan Model

This approach has been suggested by Pekin Ogan (1976). It is an extension of "net benefit approach" as suggested by Morse (1973).

The model is not intended as a formal system of HCA, but an approach to quantify the value-oriented.

Ogan (1976) draws attention to the importance of distinguishing between the HCA and quantification of human resources. The latter is a subset of the first. This means that measure and quantify in monetary value of human resources and present them in the financial statements does not make a human resource accounting system. A system of measuring human resources should have more than their mere quantification. It should be a continuous process where human resources are quantified and controlled, ie, a system that allows users to access information repeated.

The proposed model reduces to equation:

$$\hat{K}_{kj} = \sum_{j=1}^n \sum_{k=t}^{L=t} \frac{1}{(1+r)^k} V_{qj}$$

where:

$\hat{K}_{kj}$  = total adjusted net present values of human resources in a Professional service organization;

$\hat{V}_{qj}$  = certainty-equivalent net benefits;

L = end of estimated useful life of the employee for the organization;

j = jth individual; j = 1, 2, ..., n;

r = a discount rate external to the organization (risk-free);

k = time periods in the future. Revenues and costs are assumed to occur at the end of kth time period;

t = some time period from 1 to L which is a point in the useful life of the employee to which the certainty-equivalent net benefits that occur after t are discounted.

q=k+t.

According to the author the proposed model aims to serve as a conceptual field with guidelines for measuring the value of the individual to the organization. Not intended to be the solution to the HCA. Its major limitation to apply to organizations that provide professional services.

### 2.2.11. Likert Model

Rensis Likert (1967) defended the thesis that the HCA would play a key role in the development of value and, thus, increase the performance of an organization through the introduction and participatory management structure and processes which he called system 4. Likert argues that changes in causal variables such as management style, leadership strategies and organizational structures, not only result in improved productivity, cost, results, or variables of the final results of similar organizations, but also manifest themselves in improved attitudes, loyalties, motivations and objectives of performance, perceptions, skills, among others, between employees.

## 2.3. Recent Models of Measurement

### 2.3.1. Boudreau Model

Boudreau (1998) proposes a model called 'PeopleVantage'. "This is a field of work to express the theory of the firm through the link people to business results. For the author, metrics, human resources are not only an assessment tool or a method to justify the investment in human resources, but rather represent the operational expression of the theory of how people contribute to the success of the organization and how investments in human resources could lead to this success.

### 2.3.2. Cascio Model

Cascio (1996) says that one should first calculate the difference in salary between that range (a) coming out and his / her substitute (a). Assume that the differential performance is reflected by the deviations from the midpoint of the salary of the job in question. The author defines his model as:

$$DP = \sum_{i=1}^N (CR_i - CR_r) MP_i$$

where,

DP performance difference between coming out and replacing;

N=1, 2, ..., n

CR<sub>i</sub> compa-ratio is the one who leaves;

CR<sub>r</sub> compa-ratio is the one who replaces;

MP<sub>i</sub> is the annual payment at the midpoint of the level of salary payment in question.

The author questions, because the differences in performance are assumed to vary with different wages. This assumption is valid for a perfect labor market where workers receive what is worth, its marginal productivity.

### 2.3.3. Dobija Model

The author of this contribution is to associate the cost and HCA to pay the minimum wage to those resources.

Based on human capital theory, Dobija (in Bras, 2004) develops his model. It assumes, like other authors, that human capital results from a combination of four factors of the individual: his genetic inheritance, their education, their experience and their attitudes towards life and work.

Human capital is inalienable to their owner. Parts of human capital and human capital are additive is the sum total capitalized costs of survival, capitalized costs of education and the value of experience. Dobija believes

that these variables are likely to be considered individually, as happened at the time of investment. Thus, we propose to measure human capital as the sum of the capitalized costs of survival and education. The measure is expressed in the following equation.

$$H(T) = (K + E) \times (1 + Q(T))$$

where,

$H(T)$  = value of human capital;

$K$  = capitalized cost of survival;

$E$  = capitalized costs of education;

$Q(T)$  = coefficient of experience. This coefficient depends on the time given by the following formula.

$$Q(T) = 1 - T^{-\frac{\ln(1-w)}{\ln 2}}$$

onde  $W$  representa o parâmetro de aprendizagem e  $T$  o número de anos na profissão ( $T > 1$ ).

#### 2.3.4. Roslender and Dyson Model

According Roslender and Dyson (1992), from the standpoint of management, HCA is now seen as having three functions: as a field of study for making decisions on human resources as a provider of numerical information about the cost and value of people as organizational resources and motivating as the line managers to adopt a human resources perspective in their decision making.

To Roslender and Dyson (1992), since the accounting value of human resources has implications both for managers and for investors, it is essential that any future development of the field contains two elements, namely the financial and management. For the authors, aiming at adding people in the balance sheet was quickly set aside as a useful option, since the work was translated by its subjectivity.

To Roslender and Dyson (1992) is not worth theorizing about it is that as employers recognize the value of their employees. If the accounting value of its pro-employees want to chalk that researchers will need to discover what they are trying to count, something that seems rare in the case today. To Roslender and Dyson (1992), it is certainly with leading companies such investigations can begin without losing hope of such organizations already practice some form of accounting for the value of employees.

#### 2.3.5. Other Models

Miller and Wurzburg (1995), OECD researchers have studied the barriers to productivity measurement and the value of educating employees and conclude that, despite the importance of skills and knowledge of staff as a factor in his behavior, methods to measure them are not only rudimentary, but are rigidly determined by the institutions that certify.

Miller and Wurzburg (1995) come to the conclusion that the lack of more sophisticated means for measuring and valuing human resources, in particular the skills acquired through experience and training, increases the risk of misapply resources. A possible solution, but not all, is to regard as intellectual capital. Steven Albert and Keith Bradley (in Edvinsson and Malone, 1998), London School of Economics Business Performance Group, a research institute that studies the business income, have started to think about creating a "Knowledge Exchange", similar to its counterpart "Capital Stock". According to Bradley and Albert, temporary employment companies and major consulting firms are the modern version of the work of speculators.

To Gutschelhofer and Koenigsmaier (in Bras, 2004), the idea of the need for a legal title is not an essential condition in the HCA and it is unanimously accepted. The economic ownership as opposed to full ownership is legally sufficient.

Only in very rare cases can lead human resources as assets to the balance: the case of sportsmen. Another example is the cost of training, when there is a contractual agreement between the employer and the trainee in which he has to repay the costs of training, part or completely, if, for example, leaves the company before the specific date of expiration. According to authors such contracts are common in the case of the costs of training of airline pilots.

To Johanson (in Bras, 2004), accounting and human resources cost (HRCA) has been more concerned with the development of models from the perspective of management control. To Johanson (in Bras, 2004) is obvious to most of the cases that the discovery of hidden costs, yields and values serves as a strong stimulus for the

implementation of cost accounting and human resources (HRCA) in an organization. Obviously you also need to know these incitements.

Johanson (in Bras, 2004) comes to the balanced scorecard to compare with the cost accounting and human resources (HRCA). According to him both schools have much in common in that seek to increase the transparency of intangibles, though the HRCA confined to the human factor. Both try to detect the hidden costs, yields and values, though the former prefer non-financial measures, while the HRCA looking financial indicators. However, in relation to this issue, the views are not consistent. The HCA can be applied in different ways, including:

- Information on the annual accounts of income and expenses;
- Off-balance sheet but within the income and expenditure account;
- Outside both the balance in the account as income and expenses but in the annual report;
- Outside of the annual report.

In order to increase the transparency of investments in intangible and thus likely to increase investments in key strategic intangible, Johanson (in Bras, 2004) proposes the establishment of guidelines for the dissemination of information on intangibles.

In this paper, we proceeded to the presentation of the main models for measuring the HCA. It can be argued that the literature review carried out, only there is evidence of application in the present, the Lev and Schwartz model (1971). However, in the past and as experimental study model Flamholtz (1999) was applied to several companies, both industrial and service.

## REFERENCES

- American Accounting Association Committee Reports (1974). Report of the Committee on Human Resource Accounting. *The Accounting Review*. Supplement to XLIX, 122.
- BONTIS, N.; DRAGONETTI, N. C.; JACOBSEN, K. e ROOS, G. (1999). The knowledge toolbox: a review of the tools available to measure and manage intangibles resources. *European Management Journal*. Vol. 17, n.º 4, pp. 391-402.
- BOUDREAU, J. (1998). Strategic Human Resource Management Measures: Key Linkages and the People Vantage Model. *Journal of Human Resource Costing & Accounting*. Vol. 3, n.º 2, Autumn, pp. 21-40.
- BRÁS, M. F. P. A. (2004). Proposta de Relato e Medida do Goodwill Gerado Internamente pelo Capital humano Organizacional. *Tese de Doutorado*. Universidade do Minho.
- CASCIO, W. F. (1996). The Role of Utility Analysis in the Strategic Management of Organizations. *Journal of Human Resource Costing and Accounting*. Vol.1, n.º 2, Autumn, pp. 85-95.
- EDVINSSON, L. e MALONE, M. (1998). *Capital intelectual. Descobrimo o valor real de sua empresa pela identificação de seus valores internos*. São Paulo: Makron Books.
- FLAMHOLTZ, E.G. (1972). Toward a theory of human resource value in formal organizations. *The Accounting Review*. Vol. 47, n.º 4, pp. 666-78.
- FLAMHOLTZ, E.G. (1973). Human resource accounting: measuring positional replacement costs. *Human Resource Management*. Vol. 12, pp. 8-16.
- FLAMHOLTZ, E.G. (1974). Human resource accounting: a review of theory and research. *Journal of Management Studies*. Vol.11, n.º 1, pp.41-61
- FLAMHOLTZ, E. (1976). The Impact of Human Resource Valuation on Management Decisions: a Laboratory Experiment. *Accounting, Organizations and Society*. Vol. 1, n.º 2-3, p. 153-165.
- FLAMHOLTZ, E.G. – *Human resource accounting: advances in concepts, methods, and applications*. 3.<sup>a</sup> edição, Kluwer Academic Publishers, 1999. ISBN: 0-7923-8267-6.
- FRIEDMAN, A. e LEV, B. (1974). A surrogate measure for the firm's investment in human resources. *Journal of Accounting Research*; Autumn; pp. 235-250.
- HEKIMIAN, J.S. e JONES, C. (1967). Put people on your balance sheet. *Harvard Business Review*. Vol. 43, n.º 2, pp. 105-13.
- HERMANSON, R.H. (1964). Accounting for Human Assets. Occasional Paper, n.º.14, Bureau of Business and Economic Research, Graduate School of Business Administration, Michigan State University.
- LEV, B. e SCHWARTZ, A. (1971). On the use of the economic concept of human capital in financial statements. *The Accounting Review*. Vol. 49, pp. 103-12.
- LIKERT, R. (1967). *The Human Organization: Its Management and Value*, International Student Edition, McGraw-Hill.
- LIKERT, R. (1971). Human Organizational Measurements: Key to Financial Success. *Michigan Business Review*. pp. 1-5.
- MILLER, R. E WURZBURG, G. (1995). Investir dans le Capital Humain. *L' Observateur de l' OCDE*, n.º 193, Avril-Mai, pp. 16-19.

- MORSE, W.J. (1973). A Note on the Relationship Between Human Assets and Human Capital. *The Accounting Review*; July, pp. 589-93.
- OGAN, P. (1976). A human resource value model for professional service organisations. *The Accounting Review*. Vol. 51, n.º 2, pp. 316-20.
- PACHECO, V.(2002, Nov.). A contabilidade de recursos humanos e o capital intelectual das organizações. Dissertação de mestrado para a Faculdade de Economia, Administração e Contabilidade da Universidade de São Paulo.
- ROSLENDER, R. E DYSON, J.R. (1992). Accounting for the worth of employees: A new look at na hold problem. *British Accounting Review*, Vol. 24, pp. 311-329.
- SACKMANN, S.A.; FLAMHOLTZ, E. e BULLEN, M.L., (1989). Human Resource Accounting: a state-of-the-art review. *Journal of Accounting Literature*, 8, pp. 235-264.
- SCARPELLO, V. e THEEKE, H A. (1989). Human Resource Accounting: A Measure Critique. *Journal of Accounting Literature*. Vol. 8, pp. 265-280.