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Human Capital valuation and return of investment on corporate education

Nelson R. de Albuquerque [a], Marley M.M.R. Vellasco [a], Johnathan Mun [b,*], Thomas J. Housel [b]

[a] Pontifícia Universidade Católica do Rio de Janeiro, Brazil
[b] Naval Postgraduate School, Montrey, CA United States

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ABSTRACT

This paper presents the Attitude, Skills, Knowledge, and Experience–Knowledge Value Added (ASKE-KVA) methodology developed from the designed Individual Technical Competence (ITC) of a value chain to assess changes in the Human Capital of a company. It is based on the Knowledge Value Added (KVA) method, which proposes the use of a proxy variable for measuring the flow of knowledge used in a key Process. This variable creates a relationship between the company's financial results and the resources used in each of the business processes. The KVA method uses an indicator that measures the result of knowledge per unit (Kμ), which transforms costs and investments in the same unit. The ASKE-KVA methodology expands the previous concept, using fuzzy logic to measure the flow of knowledge associated with each ITC and, therefore, making it possible to obtain the return on investment of a particular business process.

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1. Introduction

The objective of this research article is to introduce a new methodology for quantifying intangible assets by measuring the impact of corporate investments in education through modifying traditional financial indicators used to evaluate the return of investment (ROI) of projects (Albuquerque, 2011). In addition, the proposed methodology can be used to map the associated knowledge, both in business processes and the key individuals associated with those business processes, to be used in the management of said knowledge.

Using known methods of Intellectual Capital (IC) valuation and Knowledge Management (KM), we amalgamated these concepts and techniques with Computational Intelligence (CI) to develop a new methodology capable of inferring the amount of human knowledge used within a company.

The proposed methodology, ASKE[1]-KVA or Attitude, Skills, Knowledge, and Experience–Knowledge Value Added, was tested in a large civil engineering and construction firm to assess whether the results obtained were consistent with the perception of its managers, and to determine if this methodology would be applicable to other companies, regardless of organization type or industry.

The results obtained by applying the methodology were consistent with the perception of the firm's managers. In addition to helping quantify the value of Human Capital (HC), the methodology assisted in assessing the impact of investments in education within a given business process, identified the gap of each individual key employee in the company's value chain, and helped identify the potential demand for training.

However, the methodology was not simple to apply; two factors hindered its application. The first obstacle was the need for working with business processes, and not by business functions, as done in most companies. The second obstacle was the need to evaluate the cost per activity in each process. However, after overcoming these difficulties, the resulting business process mapping led to an optimized proposal for an organized process of identifying human resources available and where the methodology could be used as a tool for accounting knowledge.

2. Prior research

2.1. Intangible assets

In the early 1980s, the U.S. companies that made up the S&P 500 had, on average, market values very close to their book values. At the height of the New Economy bubble (2000), the market to book ratio had risen to approximately 7:1 (with seven units of market value for each book value unit) (Lev, 2001). Although part of this phenomenon can be explained by the dramatic increase in the value of physical and financial assets during the period, there is strong evidence that accounting has not been able to record the main source of a company's value within the context of the New

* Corresponding author.
E-mail addresses: nelson.a@ele.puc-rio.br (N.R. de Albuquerque), marley@ele.puc-rio.br (M.M.M.R. Vellasco), jcmun@realoptionsvaluation.com, jcmun@nps.edu (J. Mun), tjhousel@nps.edu (T.J. Housel).

[1] ASKE – Atitude/Attitude, Habilidade/Skills, Conhecimento/Knowledge, and Experiência/Experience in Portuguese/English.

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Economy (Gan & Saleh, 2008). The reason is explained by the fact that intangible assets were not recorded and monitored by traditional accounting methods.

The term *intangible assets* comes from the association that is made within a firm's Balance Sheet. Sveiby (1998) proposed a model of a balance sheet that included both tangible and intangible assets, as illustrated in Fig. 1.

In his studies, Sveiby introduced the term *intangible liability* by asserting that the intangible assets generated the invisible capital of shareholders, as well as its obligations related to the firm's intangible assets. Sveiby identified these obligations as related to any possible contingencies with its employees, such as compensation, privileges, bonuses, pensions, etc.

Recognizing that the importance of this element is not indicated in the balance sheets of companies because it cannot be valued and recorded by traditional processes, several valuation models and taxonomies have been proposed to define this important portion of the wealth of firms. One of these terms is Intellectual Capital (IC) (Paloma, 2001), defined as the sum of Human Capital, Structural Capital, and Relational Capital.

A universal method for valuing these assets has yet to emerge. Specifically, the focus of this research is aimed at identifying a method of valuation of intangible assets capable of quantifying Human Capital, which is important to more accurately represent a company's value while highlighting the difficulty of measuring intangibles (Sveiby, 1998).

The survey presented by Sveiby (2010) identified 42 methods that purported to measure IC. In this work, he observed that most of the methods presented, from the year 2000, use the technique of Scorecards.

Although the Scorecard method is widely used, it is inadequate to measure the flow of human knowledge used in the production of goods or services and therefore does not allow the evaluation of the effect of investments in training in a particular segment or a business process (Pavlou, Housel, Jansen & Rodgers, 2005).

Among the methods surveyed that identified themselves capable of measuring a person's knowledge associated with a particular business process and linking the amount of knowledge to the formation of financial results is one proposed by Kanevsky and Housel called Knowledge Value Added (KVA) (Kanevsky & Housel, 1998), which serves as a paradigm for the development of the ASKE-KVA methodology.

2.2. Measurement of knowledge

According to the model of wealth creation of the firm (Penrose, 1959), Human Knowledge is crucial and is a resource that can be measured. Fundamental to the understanding of that concept is the association of the term *competence* to explain the human knowledge generation process.

The consideration of competence is important in the KVA model proposed by Kanevsky and Housel (1998). The KVA method is based on measuring human knowledge through the use of a surrogate variable, because there is no way to measure knowledge directly. This surrogate variable is the default time that an average employee takes to learn to develop all the tasks of a business process. This variable is static and does not allow for an evaluation of the flow of human knowledge used to carry out productive activities within the environment identified as a business process.

The concept of human competence has been widely debated in recent years, chiefly among Prahalad and Hamel (1990), Fleury and Fleury (2008) and Davenport (2001). The actual understanding of human competence points to the connection of three knowledge characteristics of human beings: knowledge, skill, and attitude, collectively termed the CHA[2] model (Dutra et al., 2008). However, the proposed measurement of human knowledge adopted in the CHA model had features that do not serve the purpose of associating the wealth generated in a process chain with the flow of human knowledge used.

As proposed by Davenport, the CHA model does not include issues related to individual experience or the emotional aspects that influence the ability of delivery or performance of a service. Another negative aspect is the oversimplification that is done in time to translate conceptual values to quantitative values.

To circumvent these negatives, we proposed an approach for measuring human knowledge associated with each technical expertise necessary to accomplish a task: the ASKE (Attitude, Skills, Knowledge, and Experience) methodology. This new methodology applies fuzzy logic to transform conceptual variables to numerical values and thus enables the creation of appropriate indices for measuring the return on investment in intangible assets such as corporate education. SKE (Skill, Knowledge, Experience), the variable obtained from the application of a Fuzzy Inference System (FIS), becomes the new proxy variable defined in the KVA methodology. Thus, this new variable becomes associated with the flow of knowledge used in a business process during a certain period of time.

The following sections detail the ASKE-KVA methodology and the results of its application in a pilot company.

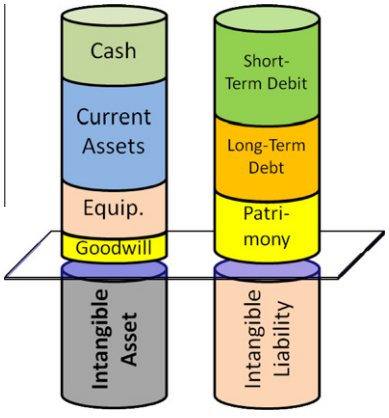

Fig. 1. Invisible balance.

3. Methodology

The ASKE-KVA methodology is capable of identifying the amount of human knowledge used within a given period. It is organized into five modules and three phases. Each phase involves different groups of people interviewed by experts in Knowledge Management, applying intelligent computing systems for measuring, and assessing the knowledge and financial indicators. Fig. 2 illustrates the block diagrams of the ASKE-KVA methodology.

In the first phase, the activities described are implemented in two modules: Module Mappings and Module K-Weight. At this stage, people involved work in the areas of planning and management. In the second phase, the potential and dynamic flow in each business process design and its inventory are analyzed. During this phase, the people responsible for implementing Core Activities (CA) are involved, including persons responsible for implementing and managing the operational activities of the company. In the third and final phase, aggregation is performed to calculate the ROI and other indicators related to the methodology.

[2] CHA means **C**onhecimento/Knowledge, **H**abilidade/Skills, and **A**titude/Attitude.

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