

Measurement of Intellectual Capital in an Algerian Company

S. Brahmi, S. Aitouche, M. D. Mouss

Abstract—Every modern company should measure the value of its intellectual capital and to report to complement the traditional annual balance sheets. The purpose of this work is to measure the intellectual capital in an Algerian company (or production system) using the Weightless Wealth Tool Kit (WWTK). The results of the measurement of intellectual capital are supplemented by traditional financial ratios. The measurement was applied to the National Company of Wells Services (ENSP) in Hassi Messaoud city, in the south of Algeria. We calculated the intellectual capital (intangible resources) of the ENSP to help the organization to better capitalize on its potential of workers and their know-how. The intangible value of the ENSP is evaluated at 16,936,173,345 DA in 2015.

Keywords—Financial valuation, intangible capital, intellectual capital, intellectual capital measurement.

I. INTRODUCTION

THE concept of Intellectual Capital is gaining importance in today's knowledge economy and plays a vital role in innovation, productivity growth, performance and competitiveness of organizations. Intellectual Capital may include the following areas: Human resources, organizational structure and processes, research and development, technology and rights related to intellectual property, and consumer networks and software providers. Intellectual capital management is a field that involves the creativity and intelligence of the people, new management methods, new information technologies, and new ways of thinking about the post-industrial organization and the new knowledge economy.

Since 1980, the performance of the company was not limited to physical assets or resources (material, tangible, real such as equipment, machines), instead of different types of non-physical resources (immaterial, intangible or intellectual capital (abbreviated as IC) such as human resources, environment, talent, patents, information, brand awareness, or knowledge, etc.) will play a key role in the company's performance.

II. PROBLEM

The balance sheets of any company contain tangible and financial assets. Conversely, intangible or immaterial assets are of great importance because they clearly explain the difference between the market value of a company and its book value. In some cases, the book value represents only

20% of its market value. It is time to give the human its fair value, as it is intelligence, competencies that create value and resourcefulness in the enterprise.

Knowledge creates value and in an economy based on knowledge, measuring of this created capital is crucial. It is assumed that it is an intangible asset in an organization and cannot be calculated by the traditional formulas that are used to assess the tangible and physical assets. The main related field that has been explored in the literature to evaluate the intangible assets is the domain of intellectual capital [1]. Measuring this value leads to the measuring of intellectual capital and its impact on the company's performance, which is the aim of this work.

III. PURPOSE OF WORK

The purpose of this paper is the application of WWTK for the measurement of intellectual capital; it is a method for the financial valuation of intangible resources on the ENSP at Hassi Messaoud belongs to Sonatrach group.

The underlying purpose of this study is to attract the attention of the leaders of Algerian companies to the importance of intellectual capital of a manufacturing company or service provider, and how to enhance its capital and types namely; human, structural and relational capital.

IV. INTELLECTUAL CAPITAL

A. Capital

The word capital is derived directly from the Latin *capitale*, with the adjective corresponding to the noun *caput*, meaning head. It originally referred to the head part of a debt.

Over the centuries, the meaning of the word broadened until not only interest-bearing sums of money were considered capital, but all sorts of other collections of wealth were considered capital.

Capital is a term from the economy: It is a factor of production. It is with this idea that the concept of 'human capital', which was developed and popularized by Gary Becker, as an analogy to physical capital or financial capital [2].

B. Immaterial, Incorporeal, Intellectual, Intangible

Let us consider the term "immaterial", "incorporeal", "intellectual" or "intangible". Use of the term "immaterial" is a way of opposing the "hardware", while the use of the term "intellectual" seems to give high priority to human capital, knowledge and expertise [2].

Samira Brahmi, Samia Aitouche, and M. Djamel Mouss are with the Automation and Manufacturing Laboratory, Industrial Engineering Department, Batna 2 University, Batna 05000, Algeria (e-mail: brahmi.samira@gmail.com, samiaaitouche@yahoo.fr, d_mouss@yahoo.fr).

C. Intellectual Capital

Most authors use the term intellectual capital. Stewart defines it as “packaged useful knowledge. Roos [2] defines intellectual capital as “the sum of the knowledge of its members and the practical translation of this knowledge into brands, trademarks and processes”. Edvinsson and Malone [6] define it as “the possession of the knowledge, applied experience, organizational technology, customer relationships and professional skills that provide a company with a competitive edge in the market”. Andreissen [3] defines intellectual capital as a subset of intangible resources that includes all resources that are based on the capabilities and intellectual activities.

V. INTELLECTUAL CAPITAL CLASSIFICATION

According to the field's authors, there are several classifications of intellectual capital:

According to Zadjabari [1], intellectual capital includes three types of capital: social capital, human capital and market capital. Human capital is related to individuals, social capital is related to employee relations within an organization and the capital market is linked to external customers. Thus, Edvinsson and Malone [4] decompose intellectual capital into human capital and structural capital, the latter being itself composed of organizational capital and customer capital.

Edvinsson and Brünig [5] still differentiate between human capital and structural capital. Structural capital consists of customer capital and organizational capital. This again distinguishes between capital and innovation capital process.

Andriessen [3] divides intellectual capital into three categories: structural capital, relational capital and human capital as the basic dimensions of intellectual capital.

A. Human Capital

The term human capital has its origins in the work of economists Schultz in 1961 and Becker in 1964 in [4], which designated by this term all abilities, physical and intellectual, of the labor force available for economic production, for example:

- Knowhow,
- Professional qualification,
- Tacit Knowledge,
- Skills.

B. Structural Capital

The structural capital comprises all non-human warehouses of knowledge in organizations. Edvinsson and Malone in [6] define structural capital such as equipment, software, databases, organizational structure, patents, trademarks, and all organizational capacities that support employee productivity.

- Intellectual property,
- Explicit Knowledge,
- Infrastructure assets,
- Process capital.

C. Relational Capital

Relational capital in [3]-[7] is defined as all the resources related to external relations of the company. It is the value of the relationship with the customer, suppliers, strategic partners, employees and the perceptions they hold on the company.

- Reputation and corporate image,
- Faithfulness and customer satisfaction,
- Network capital.

We opt for the classification of intellectual capital by Andriessen [3], the author of the toolbox used in this work.

VI. DIFFICULTIES OF MEASURING INTELLECTUAL CAPITAL

The first reason is historical. The accounting rules are initially designed for tangible assets and not for intangible assets. Second, some intangible assets are difficult to measure. Creativity, for example, is at the heart of a knowledge generation process, unpredictable process with unpredictable results. Third, is the idiosyncratic nature of intellectual capital; what is valuable for one company may be worthless to another. This has led to the various measurement systems [8].

VII. SURVEY ON INTELLECTUAL CAPITAL MEASUREMENT

Recently, several research works were conducted on the measurement and evaluation of intellectual capital in a company.

Sundac and Krmpotic [9] measured the intellectual capital with CIV method (Calculated Intangible Value) in four major companies in Croatia. The intellectual capital report provides actual development prospects in the competitive advantage of some companies.

Cappelletti [4] proposed a socio-economic assessment of management skills over time in his experimentation on a French company of 700 employees. The socio-economic model only measures human capital.

Hormigad [10] measured the intellectual capital (financial and statistical methods) in 130 companies. They measured only the human capital that is of importance to company performance.

VIII. METHODS FOR MEASURING INTELLECTUAL CAPITAL

There are several groups of methods for measuring intellectual capital that can be used to assess these resources. Some of these methods were attempts by various companies for their internal use rather than developing a method of universal measure, but they still exist and are the basis for creating new methods.

According to Sveiby, measuring approaches for intangibles fall into four categories of measurement approaches [7], [9], [11], which are:

- *Direct Intellectual Capital methods (DIC)* where components are identified and valued;
- *Market Capitalization Methods (MCM)* where the difference between market capitalization and stockholders' equity is calculated;
- *Return on Assets methods (ROA)* where tangible assets

and the annual financial growth figures are compared to the industry average. Above average earnings are then utilized to estimate the value of intangible assets;

- *Scorecard Methods (SC)* where the various components of intellectual capital are identified and reflected in terms of scorecards and graphs.

IX. WWTK METHOD

WWTK is a method for the financial valuation of intangible resources, classified in the category of methods ROA. Created in 2004 by Andriessen, WWTK is based on a survey of 25

existing methods of measurement and evaluation in the literature [1].

WWTK assists managers operating successfully in the intangible economy, given the strategy analysis and a quantitative evaluation of intangible assets. It consists of 20 steps grouped into six phases, which are Do intake, Identify intangible resources, Conduct value assessments, Perform financial valuation, and Develop management agenda, Report value dashboard (each phase is completed by a checklist, suggestions and practices).

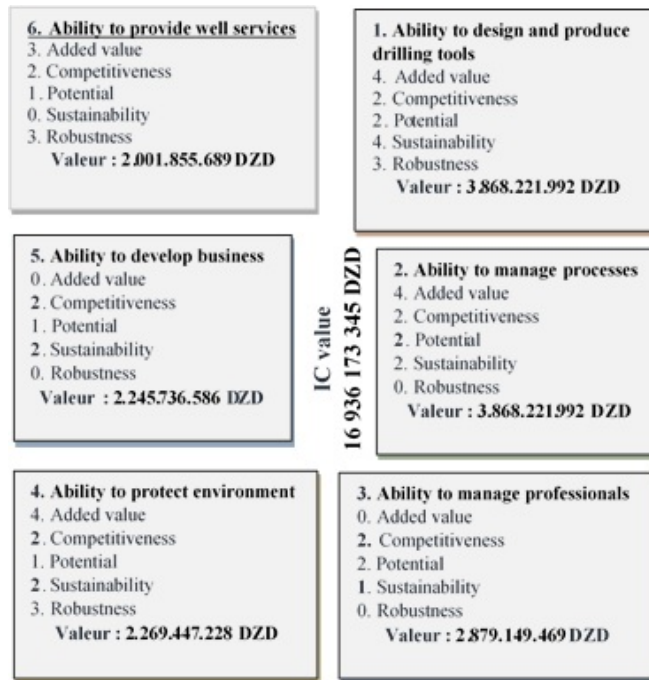


Fig. 1 Financial value Dashboard of the ENSP

X. APPLICATION AND RESULTS

We Applied the WWTK for the measurement of intellectual capital in the ENSP in Hassi Messaoud city, in the south of Algeria. For this application, we follow two models for the 20 steps [12], [13]:

- Structural (present the components in connection to the method)
- Behavioral (which presents the progress of the method);
- Use of a spreadsheet such as Microsoft Excel for the financial evaluation.

As a result, we obtain the Dashboard, which is in graphic form that is useful to show the relative value of each core competency, as presented in Fig. 1.

XI. CONCLUSION AND FUTURE WORK

We arrived to calculate the intellectual capital (all intangible resources) of the enterprise ENSP at 16 936 173 345 DZD. It is a positive value. The intellectual capital is a competitive advantage and benchmarking.

This work has opened the following perspectives:

- Perform the measurement of intellectual capital by other existing methods of measurement to compare and certify the results of the WWTK; and,
- Perform intellectual capital measuring on other Algerian companies by applying WWTK.

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