

The Value of *Intellectual Capital* Applying the Andriessen's Method: The *Efacec Power Solutions* Case

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Abstract— The main objective of this paper is to present another way, simple and reproducible by any research, for measure the value of the intellectual capital, using the Andriessen's method (2004) [Netherlands]. This new approach, has the advantage of its simplicity: it is composed by six steps (in a short formulation from the original) and also is an integrated method. Therefore, it can be applied only by following the steps, described below. The lack of consensus about what is the intellectual capital can be overcome if we think it like all which is intangible from the intellect and create value translated in a monetary way. The results suggest that the method can be widely applied, and allow to achieve a specific value for the intellectual capital in a giving organization. In this case: 1.908 million € in a Portuguese company whose name is EPS, Efacec Power Solutions. The paper also defends that the proposed method can be applied to other technological companies, allowing to compare both its applications and results benchmark.

Keywords— Andriessen's Method, Core Competencies, (Value of) Intellectual Capital.

I. INTRODUCTION

One of the main topics in the intangible assets, is the intellectual capital. Some authors have been considering it alone like Gogan and Draghici (2016) [Romania] and Berzkalne, Zelgalve (2014) [Latvia] and Palacios and Galván (2007) [Spain].

While others, especially Sumedrea (2013) [Romania], Sekhar *et al.* (2015) [India], Nuryaman (2015) [Indonesia], and Abdullah and Sofian (2012) [Malaysia] for whom *intellectual capital* is a synergy. Comes from knowledge, experience, invention and innovation, with effects on business value.

These and others authors, until 2020, do not meet consensus, about the definition of what is the intellectual capital. Palacios and

Galván (2007) [Spain], state that the definition is not unique. For Gogan and Draghici (2016) [Romania] and Berzkalne and Zelgalve (2014) [Latvia] [*human, structural and customer capital*] there are differences regarding the semantic meaning of their components. And their number, as in Sekhar *et al.* (2015) [India].

The lack of consensus is also present regarding about how to measure it, like Arvan *et al.* (2016) [Australia and

USA], Gogan and Draghici (2016) [Romania], Rodov and Leliaert (2002) [Netherlands and Belgium], Pulic (2000) in Berzkalne e Zelgalve (2014) [Latvia] and Housel and Nelson (2005) [USA].

And how to know his value, especially inside the companies which have it, as can be seen in all authors with the lack of consensus about how to measure the intellectual capital.

If we don't have a widely accepted definition about what is, how to measure and how to calculate the value of intellectual capital in a company? Additionally, there is also a shortcoming: to know about how companies create value. And how they can achieve better business performance. And competitive advantages, between themselves, their markets and the countries. This is a (main) problem: how to know the value of intellectual capital in a company?

Previous work, in authors like Housel and Nelson (2005) [USA] and Rodov and Leliaert (2002) [Netherlands and Belgium], even though they make a contribution towards to know the value of intellectual capital, they are very complex and difficult to apply in the reality.

From the relevant literature, regarding the intellectual capital, one author can be highlighted: Andriessen (2004)

[Netherlands]. This author has a large work about the topic such as Andriessen (2003, 2005, 2007, 2008, 2011) [Netherlands] and also Andriessen and Van Den Boom (2007a, 2007b, 2009) [Netherlands].

Andriessen (2004) [Netherlands], proposes a method that can overcome some of the limitations mentioned about the intellectual capital. That is, problems with the definition, the way about how to measure it and to know the value of intellectual capital in a certain company. Three reasons form the basis for adoption it:

- 1) Definition: intellectual capital is an ability owned for a company to do something;
- 2) Measurement: can be by a systematic *Weightless Wealth Tool Kit*, in Andriessen (2004, p. 376), it turns to be less complex, and can be applied by everyone to several companies as long as they meet some requirements and is integrated (with 20 sequential steps);
- 3) Value: can be achieved in €, under certain reasoned assumptions, made by the researcher.

The empirical evidence from where the Andriessen's (2004)

[Netherlands] method is applied to a Portuguese company, on 31st December 2017: *Efacec Power Solutions, SGPS, SA (EPS) [Portugal]*¹.

There are seven reasons to have chosen this company: it is a Portuguese company with over 70 years old (founded by Portuguese), covers more than one sector of activity (energy, engineering, procurement, construction and electric mobility), is a technological company (capital intensive and strong weight of *intellectual capital*), is a large company² (> 250 employees, turnover > 50 million € and total assets > 43 million €), is internationalized, uses technology in relations between suppliers and customers, and creativity, innovation and technological development are important in the global offer of goods and/or services.

This provides an approach where literature is not abundant and hence the increased research relevance and interest.

The research question in this *paper* is the following: *How to apply the Andriessen's method in a given company and how to achieve also to a specific value of his intellectual capital in a moment of the time - on 31st December 2017?*

¹ Seventy-years old.

² In accordance with the legal concept in Portugal, in year 2019.

This question has arisen from the need to know how to apply the method to a Portuguese company, in this case. On the other hand, until 2019, there are no case studies concerning about Portuguese companies, and is reasonable to think that the current knowledge in the intellectual capital will be higher with such a case.

The purpose of this *paper* is to apply the Andriessen's (2004) [Netherlands] method, to a Portuguese company case, and find a specific value of the intellectual capital.

The contribution of the *paper* for the scientific knowledge is to enlarge the stock of knowledge in the field of intangible assets, especially, in the topic of the intellectual capital. This approach will be done by answer to the research question and also describing the main steps of the Andriessen's (2004) [Netherlands] method. Therefore, it can be applied by any researcher in other different cases.

The *paper* is organized as follows. Section 1, this Introduction, that presents the background about the topic of the intellectual capital, some previous work, why was chosen the Andriessen's (2004) [Netherlands] method, the research question, how and why it has arisen, the purpose of the paper and also is contribution for the scientific knowledge in the field and in the topic. Section 2, Method, presents the main issues of the Andriessen's (2004) [Netherlands] method to measure the value of intellectual capital regarding the *Efacec Power Solutions, SGPS, SA (EPS) [Portugal]* company, on 31 December 2017. Then, in Section 3, Results, are given the results of implementing the method on the organization. Section 4, Discussion, provides a discussion of the results achieved. The *paper*, in the Section 5, Conclusions, is finished presenting the main conclusions, some limitations and avenues for future research. A brief reference about the originality/value of the *paper* and his type, is also mentioned. In the Section 6, there are some acknowledgments regarding important people with suggestions and, last but not the least, the references which give the basic support to the *paper*.

II. METHOD

It is a case study (qualitative research method) in combination with quantitative research method (triangulation). The sources of gathering data, are the *Efacec Power Solutions, SGPS, SA (EPS) [Portugal]*, mainly, Financial Statements, regarding 2017 and 2016 – with secondary data. Some financial information for calculations in specific steps was also required: historical and forecast about interest rates, average cost of capital, and risk premium.

The method is embodied in the Andriessen's (2004) [Netherlands] method to measure and calculate the value of intellectual capital, in a particular company.

The original *Weightless Wealth Tool Kit*, by Andriessen (2004, p. 376) [Netherlands], has 20 steps. But, for simplicity and understanding beyond easy of use, only the most important six steps will be mentioned. The time is the beginning of the year 2018 and the goal is to calculate the value of intellectual capital, on 31 december 2017. The financial information (and other) about the EPS in 2017 (and before) is known and available.

Step One: definition of the number and core competencies³ of the EPS. In the basis, this company has eight business units⁴. The procedure is set a number of core competencies (based on a subjective assessment of the researcher – the most suitable). Each of them, must have a same function to produce a good and/or a service. In the case of EPS, four were defined (built on the imputation of each of the eight business units): *Hardware and Software Design and Development (Core Competence 1)*, *Technology Development, Equipment Behavior Simulation and Power Grid Management (Core Competence 2)*, *Transport Solutions (Rail, Road and Metro) and Energy for Electric Vehicles and Network Management (Core Competence 3)* and *Design and Operation of Water Systems and Industrial Facilities (Core Competence 4)*.

Step two: Calculation of the normalized (average) income (from sales or turnover). That is, income (only ordinary) minus costs (only ordinary), from financial statements. In this case, 2017, 2016 and 2015. For example, with a excel worksheet (WSPS1), it is possible build a first line (1L) and first column (1C) with the names. The 2L, 3L, and 4L, in 1C, with the observed values for the sales. In 1L and 5C the normalized sales (430 million €). In the 1L and 6C, 7C and 8C, 2018, 2019 and 2020, sales forecast, respectively. In 2L and 1C, is the nominal annual rate of change sales and/or services, which can be obtained from 1L and 3C and 1L and 4C. The average rate must be in 2L and 5C (1.84%). This average must be the basis for forecast sales in the year 2018 (1L and 6C), 2019 (1L and 7C) and 2020 (1L and 8C).

Step three: Calculation of the fair return rate. Open other excel worksheet (WSPS2). In 1L and 1C we should

put the names. From 1L to 4C, for the years 2015, 2016 and 2017, we should put the book values, respectively. In the 1L and 5C, we put the average of these three.

In 2L and 1C, we must put the real economic growth rate in Portugal (known and available). In 2L, from the 2C to 4C we put the rates. In the 1L and 5C, we put the average rate, calculated from these three.

In 3L, if we think that EPS sales grew at the same rates, from 2C to 4C, we put the same rates. Thus, in 3L, from 2C to 4C, we define the total fair return rate. In 3L and 5C we also put the average rate equal to the total fair return rate.

If we see the financial statements on 2017 of the EPS, we can see that the intangible and the tangible assets have a weight of 0.66 and 0.33, respectively. In this case, the rates, in the 3L from 2C to 4C, we must only consider the rates multiplied by these factors. Consequently, in 4L from the 2C to 4C we must multiply each percentage for 0.66 and in 5L for 0.33. The final value in 4L and 5C is, 1.23% and in 5L and 5C, is 0.61%. The sum of these values is equal to the average rate normalized: 1.84%. In step one, we calculated the average normalized. In this step calculate the value of tangible assets minus average normalized (142 million €) and also the value of intangible assets minus average normalized (288 million €). Both must be equal to the average normalized (430 million €). The value of the intangible assets minus average normalized is the intangibles-driven earnings (IDE) for the year 2017. For the past. Is also the basis to forecast for the next 10 years plus 1 (from 2018 to 2027 +2028).

Step four: With the help of another worksheet (WSPS3), we must build the forecasts suitable for the nominal annual rate of change sales and/or services from 2018 to 2028 for growing the sales (from 288 million €). And also, for the calculation of the discount rate in the same period (interest rate without risk plus average cost of capital and also the risk premium).

Step five: After all these calculations, we must calculate the net present value (NPV) of each forecast sales, from 2018 to 2028, to the year 2017 and, his sum, will be, at last, the value of the four core competencies which is the same like the value of intellectual capital.

Step six: The final value achieved must be distributed with a reasonable way by the four (in this case) core competencies.

³ Referring to December 31, 2017. Are the skills for... (doing something in a company).

⁴ If the basis is goods and/or services, the same procedure, mutatis mutandis.

III. RESULTS

In the main results, the total value of *intellectual capital* is equal to the sum of the value of the four *core competencies* and his distribution, can be seen in Figure 1.

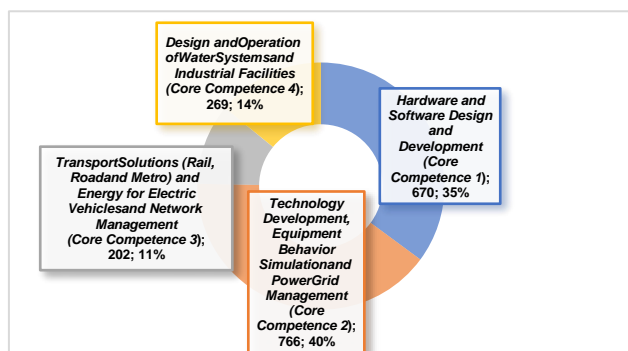


Fig.1. - Four Core Competencies = Value of Intellectual Capital (Million of € and partial percentage of total) (31st December 2017)

Source: Own Construction.

It should be noted that, the total value of EPS's intellectual capital on 31 December 2017 is, 1.908 million €. It is the sum of the partial value, in millions €, in each of the four core competencies identified: C1 = 670 Million€, C2 = 766 Million€, C3 = 202 Million€ and C4 = 269 Million€.

IV. DISCUSSION

The results above need some comments. The total value of the intellectual capital, is sensitive to some basic assumptions: some of them are the nominal annual rate of change sales and/or services, the basis for forecast sales and the normalized sales.

On the other hand, can still be highly sensitive to the, initial value of intangible assets minus average normalized. The assumptions about interest rate without risk plus average cost of capital and also the risk premium, are another important in the same context.

All of these must be very well supported and explained. For achieve feasible results about the value of the intellectual capital, in a certain moment of time.

Some work of authors like Housel and Nelson (2005) [USA] and Rodov and Leliaert (2002) [Netherlands and Belgium], built some strange and complex concepts to understand that are very confused and impossible to apply in particular and even general situations. These authors and others, given not a contribution to clarifying what is the intellectual capital and to use it but, rather the final outcome is leaving someone to refuse applying it. Their

papers are to be of less application as their contribution to the scientific knowledge in the field of intangible assets and, in particular, about the intellectual capital is difficult to apply and reproduce.

Contributions like the one proposed by Andriessen (2004) [Netherlands], turn possible to use it in several activity sectors, is simple to use even that can bring some complexity about their assumptions. Other advantage is visible when it allow a researcher the possibility to make sensitive analysis.

The value of 1.908 million € of intellectual capital in EPS, on 31st December 2017, is a number in line what was expected because it is a company highly intensive in capital, specially, gray matter. It is the gray matter, and the inside motivation over the workers, to bring for long time, new ideas, by creativity, and innovation that can explain a high value of the intellectual capital. Thus, this profile can be a stimulus to improve what have been done by EPS and also produce another news goods and/or services for satisfaction the needs of the customers (current and future).

V. CONCLUSIONS

The research question initial was: *How to apply the Andriessen's method in a specific company and how to achieve also to a specific value of his intellectual capital in a moment of the time?*

By describing in deep, in six steps, from the Andriessen's (2004) [Netherlands] method, we managed to reach a specific value to a specific company: the EPS intellectual capital, on 31st December 2017, was 1.908 million €.

Therefore, we could explain how to apply, by describing their method in a developed way, such that another researcher can apply it, whether replicating to the same company or a different one. In this case we answered to the questions about how to apply the method.

Because there is no case studies regarding Portuguese companies, that's way we have chosen EPS. In doing so we think we start a study and allow future benchmarking for measuring intellectual capital in Portugal.

Regarding the contribution of the *paper*, we stand out that, the research question was answered in a suitable way. This way could overcome some difficulties of approaches that come from Gogan and Draghici (2016) [Romania] and Berzkalne and Zelgalve (2014) [Latvia], Sekhar *et al.* (2015) [India] and Housel and Nelson (2005) [USA]. Those previous work has almost no real life application.

One explanation for that is the complexity of them. They, precisely, donot give a real contribution to enlarge the scientific knowledge either in intangible assets or in intellectual capital other than the theoretical discussion of intellectual capital.

The application of Andriessen's (2004) [Netherlands] method, in six steps, was achieved. We need to alert that if business information is insufficient or unreliable, it is not possible to apply the method. Business age is indifferent as long as required information is available. Finally, we cannot be able to use defined indicators, because some information is prospective (most be forecasted) in nature.

In the Limitations, we highlight the definition of subjective assumptions, associated with the six steps resumed of the method, which leads to unified results. On the other hand, there is some subjectivity in defining the number and the content of core competencies. And there is knowledge that is common to many core competencies. So, the definition of these could have been different and a spatial scope of application is not delimited.

In the Implications, by reason of the aforementioned subjectivity, the discount rate, the risk premium and the (forecast) inflation rate without risk, used in the event of minor variations may under or over assess the value of intellectual capital obtained (at the time considered). So, it is not unique. Thus, although one value has been reached, another ($>$ or $<$) is possible as long as it is well founded. This value is actually dynamic because the fundamentals of calculation vary each day. Thus, it only makes sense on December 31, 2017, in light of the assumptions adopted.

As Avenues for Future Research, its application stands out to other technological companies, domestic and foreign, to know and compare the values achieved.

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