The impact of intellectual capital on financial performance in the fishing industry: evidence from France

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Abstract

The purpose of our study is to explore the influence of intellectual capital and its components on the French fishing companies' profitability performance. We included 289 French fishing companies in an empirical examination in the period 2015 to 2019. The model used in this study is the Value Added Intellectual Coefficient - VAIC™ developed by Pulic (2000). The results show that French fishing companies improve its financial performance from intellectual capital components, human capital and structural capital.

Key words: *Intellectual capital Efficiency, Financial performance, Fishing companies, France*

1. Introduction

Metropolitan France has two shorelines, one at the North Atlantic Ocean and the other at the Mediterranean Sea, and as the current French Minister of the Sea, Annick Girardin, has proclaimed, the 21st century should become a "maritime century". (MINISTÈRE DE LA MER. https://mer.gouv.fr) Six decades ago, France was the third country, following Japan and the Russian Federation, with the largest shares of catches (3%) while today France is not among the countries with the largest shares of catches. (GUTIÉRREZ, INGUANZO, 2019)

Still, France is one of Europe's largest fish and seafood markets (BUASON, AGNARSSON, 2020, p. 137), while the EU is a major world market for fish and seafood with consumption amounted to 12.48 million tonnes in 2018. (EUMOFA, 2020, p. 31) The consumer prices of fishery and aquaculture products have been growing significantly since 2014 and by 2019; they were 14% higher than eight years before. (EUMOFA, 2020, p. 13) Spain, Italy and France are the top three consumers, accounting for close to 80% of the total volume of fresh fishery and aquaculture products consumed by households in the 12 countries which together accounted for 87% of total EU expenditure on fishery and aquaculture products. (EUMOFA, 2020, p. 44) From 2018 to 2019, the household expenditure for fishery and aquaculture products increased in all Member States (EUMOFA, 2020, p. 13) including France where the household consumption of fresh fishery and aquaculture products in 2019 reached 205.174 tonnes (EUR 2.38 billion). (EUMOFA, 2020, p. 46) The household nominal expenditure on fishery and aquaculture products in France in 2019 was 8.724 million euros, making it the third EU country behind Italy and Spain. (EUMOFA, 2020, p. 35) France was the sixth EU country (behind Malta, Portugal, Spain, Denmark, and Luxembourg) in terms of apparent per capita consumption of fishery and aquaculture products in 2019 with 33,52 kg live weight per capita, and the eighth EU country in terms of per capita household nominal expenditure with 130 euros per capita (EUMOFA, 2020, p. 35)

In the contemporary world, aquaculture has increased due to technological innovations, genetic improvement of species, innovations in management practices and diets and improvement of property management (RODRIGUES NASS, POVH, FORNARI, RIBEIRO, BRUMATTI, 2020) and therefore aquaculture is becoming more important in the production of fish but the amount of fish catches is still impressive. (GUTIÉRREZ, INGUANZO, 2019) According to the estimate of the Food and Agriculture Organization, more than 40 million people depend on wild capture fisheries as a source of income and employment. (THANASSEKOS, SCHELD, 2020). However, as Arnason (2011) points out, the word's capture fisheries do not seem to be generating much net economic benefits or rents. Global fisheries may underperform due to overfishing, harmful subsidies, and over-capacity. (CÁMARA, SANTERO-SANCHEZ, 2019)

In the Mediterranean European countries, stock productivity and fleet profitability are generally impaired by a combination of high fishing mortality and inadequate selectivity patterns. (COLLOCA ET AL., 2013) Moreover, in this area, 85% of the assessed stocks are currently overfished, while populations of many commercial species are characterized by truncated size- and age-structures. (COLLOCA ET AL., 2013)

Like agricultural production, variability is also widely present in the fishing industry. As with agriculture, fishing has also been confronted with the combined effects of environmental and market variability. But some causes of variability are specific to the fishing industry, particularly as the result that capture fisheries are based on fish stocks found in nature. (ARNASON, 2011). "Variability in the abundance of fish stocks and fisheries production results from shifting environmental conditions and may be amplified by exploitation and changes in age and spatial structure of the spawning stock." (THANASSEKOS, SCHELD, 2020). Farella, et al. (2021) pointed out that industrial fisheries have caused the alteration of habitats, the reduction of biodiversity and the main fish stocks". Climate change, which can have physical and biological consequences, poses a significant threat to fisheries (MOHAMMED, URAGUCHI, 2013). It has been argued that climate change and continued fishing pressure are expected to increase fisheries' variability globally. (THANASSEKOS, SCHELD, 2020) The effects of climate change in fisheries are reflected in particular in the decline of fishing yield and loss of lives during extreme weather events in the sea. (DIOUF, OUEDRAOGO, ZOUGMORÉ, NIANG, 2020). Thanassekos and Scheld (2020) state that large inter-annual changes in production can reduce access to fishery resources and have detrimental impacts on fishers and their communities. "Additionally, the economic effects of fisheries' variability are modulated through prices, suggesting market structure may be consequential when considering the relationship between natural variability, income, and employment." (THANASSEKOS, SCHELD, 2020). Due to the fact that fuel is an item with a large impact on fisheries, the oil price plays an important role in this industry as well. As Carvalho and Guillen (2021) state, the EU-27 fishing fleet consumed 2.02 billion liters of fuel to catch 4.48 million tons of fish, valued at €6.7 billion in 2018 and explained the increasing trend of the profitability of the EU fishing fleet partly as the consequence of the improvements in the energy efficiency and recovery of fish stocks in the North-east Atlantic.

To understand the financial performance of fisheries, and in particular, when comparing fisheries of different states, it is necessary to take into account the quota allocation mechanisms which have distributional effects that are highly relevant to the economic organization of fisheries. (BELLANGER, MACHER, & GUYADER, 2016) Regulators in many countries have adopted individual quotas as a means of dealing with the open-access problem inherent in fisheries. (EKERHOVD, GORDON, 2020). In Europe, the management of fisheries mainly relies on Total Allowable Catches (TACs) set by fish stock and distributed to member states according to historical allocation keys and each member state is responsible for managing its own quotas, and different countries allocate their quotas among producers

using various systems (BELLANGER, ET AL, 2016) fishing allocations are non-transferable in France and quotas are shared among Producer Organizations (POs) based on the historical landings of their members." (BELLANGER, ET AL, 2016)

2. Literature Review

Numerous scholars have explored the relationship between intellectual capital and a company's performance in various industries including the manufacturing industry, hotel industry, automotive industry, financial and banking industry, the insurance industry, energy industry, pharmaceutical industry, textile industry, engineering consulting industry agricultural industry (PETKOVIĆ, KNEŽEVIĆ, PAVLOVIĆ, 2020, p. 466) and shipping industry. (XU, ZHANG, 2021)

Many previous studies showed a positive relationship between intellectual capital and a company's financial performance by using the VAIC method (GE, XU, 2021; HAMDAN BUALLAY, ALAREENI, 2017; HARIS, YAO, TARIQ, MALIK, JAVAID, 2019; LE, NGUYEN, 2020; LI, NOSHEEN, HAQ, GAO., 2021; MAJI, GOSWAMI, 2016; OPPONG, PATTANAYAK, 2019; XU, ZHANG, 2021).

But it should be known that the term "performance" and the term "financial performance" are defined and used differently. As Firer and Williams (2003, pp. 348) pointed out, "a precise definition of corporate performance proves to be highly elusive despite frequent use by various special interest stakeholder groups, scholars and policy makers alike. The lack of consensus may arise because this concept is associated with a variety of facets of a firm's overall wellbeing, ranging from financial profitability to output levels to market returns."

Exploring papers published in relevant journals reveals that some scholars analyze the influence of intellectual capital on firm performance (LI, NOSHEEN ET AL, 2021; GE, XU, 2021; XU, LIU, 2020; BAYRAKTAROGLU, CALISIR, BASKAK, 2019; HAMDAN, BUALLAY, ALAREENI, 2017; MAJI, GOSWAMI, 2016; KOMNENIĆ, POKRAJČIĆ, 2012; CLARKE, SENG, WHITING, 2011; ZÉGHAL, MAALOUL, 2010; MUHAMMAD, ISMAIL, 2009; KAMATH, 2004), some on corporate performance (DZENOPOLJAC, YAACOUB, ELKANJ, BONTIS, 2017; FIRER, WILLIAMS, 2003), some on business performance (HUANG, HSUEH, 2007), some on economic performance (STÅHLE, STÅHLE, AHO, 2011), some on financial performance (CASTRO, DUQUE RAMÍREZ, MOSCOSO ESCOBAR, 2021; XU, ZHANG, 2021; WEQAR, KHAN, HAQUE,

2020; DESOKY, MOUSA, 2020; NAUSHAD, 2019; XU, WANG, 2019; BONTIS, JANOŠEVIĆ, DŽENOPOLJAC, 2015; JANOŠEVIĆ, DŽENOPOLJAC, BONTIS, 2013; JOSHI, CAHILL, SIDHU, KANSAL, 2013; CHAN, 2009), some on long-term financial performance (JORDÃO, ALMEIDA, 2017), some on corporate financial performance (CHU, CHAN, WU, 2011), some on operating performance (LEE, LIN, 2019), some on profitability (LE, NGUYEN, 2020; HARIS, YAO, TARIQ, MALIK, JAVAID, 2019; YALAMA, COSKUN, 2007), some on financial performance and market value (FORTE, MATONTI, NICOLÒ, 2019; CHEN, CHENG, HWANG, 2005), some on productivity (OPPONG, PATTANAYAK, 2019), some on organizational performance (HUANG, HUANG, 2020; GRACIOLI CAMFIELD, GIACOMELLO, SELLITTO, 2018), some on corporate value (TSENG, JAMES GOO, 2005); while some use financial performance and corporate performance interchangeably (TAN, PLOWMAN, HANCOCK, 2007).

But, under economic performance, firm performance, corporate performance, financial performance, long-term financial performance, corporate financial performance, operating performance, organizational performance, corporate value and market value, productivity, as well as profitability various scholars consider different things.

Concretely, exploring the effect of intellectual capital on financial performance sometimes mean exploring the effect on earnings quality measured by the logged value of EBIT, profitability measured by ROA and ROE and companies' efficiency measured by ATO (XU, WANG, 2019), sometimes on ROA, MTB (market value indicator) and Tobin's q (share value indicator) (CASTRO, ET AL., 2021), sometimes on net profit, operating revenues, operating profit, ROE and ROA (JANOŠEVIĆ ET AL., 2013), sometimes on MB, ROA, ATO and ROE (CHAN, 2009), sometimes on profitability measured by ROA and productivity measured by ATO (WEQAR, ET AL., 2020), sometimes on ROA and growth in revenues (FORTE, ET AL, 2019), sometimes on ROA, ROE, growth in net sales, and net value added per employee (CHEN, ET AL., 2005), sometimes on ROA and ROE (DESOKY, MOUSA, 2020; NAUSHAD, 2019), and sometimes only on ROA (FIRER, WILLIAMS, 2003; JOSHI, ET AL., 2013, XU, ZHANG, 2021) For some scholars, ROA and ROI (Returns on investments) indicate economic performance (STÅHLE, ET AL, 2011), other consider ROA as a firm performance indicator (MAJI, GOSWAMI, 2016). For the vast majority, ROA and ROE are profitability indicators (XU, LIU, 2020; XU, LI, 2019; DZENOPOLJAC, ET AL., 2017). But, some scholars consider gross profit margin (GPM), net profit margin (NPM), and EPS as profitability indicators, while ROA, ROE and ROIC are considered as corporate return indicators (GE, XU, 2021; JORDÃO, ALMEIDA, 2017) HARIS, ET AL (2019),

recognized four profitability indicators: ROA, ROE, net interest margin (NIM), and profit margin (PM).

Some authors consider an Income Statement's item as a profitability indicator, while others consider either Income Statement's item (like EBIT or EBITDA) or a ratio based on an Income Statement's item. (JORDÃO, ALMEIDA, 2017) Other consider EBIT and EBITDA as an earnings indicator, while a ROA and ROE as profitability indicators are extended by net profit margin (NPM), gross profit margin (GPM), and EBITDA margin (EBITDA_m), (DZENOPOLJAC, ET AL., 2017) Some authors consider EBIT as an indicator of earnings quality. (XU, LI, 2019) Some scholars consider ROE as a financial performance indicator and ROA as an operational performance indicator (HAMDAN, ET AL, 2017). Some scholars introduce the term "economic operating profitability" and calculate it as the difference between income and production costs (ZÉGHAL, MAALOUL, 2010). But more important, various scholars calculate sometimes some ratios differently. For example, while the vast majority calculate ROA as EBIT (or operating income) divided by average total assets, some scholars calculate it as Profit before tax divided by average total assets (CLARKE, ET AL., 2011), while some scholars calculate ROA as Net Income divided by average total assets. (XU, LI, 2019; XU, ZHANG, 2021)

Moreover, for some scholars, ATO (Asset turnover – Revenue/total asset) is a measure of a firm's efficiency (XU, LI, 2019; DZENOPOLJAC, ET AL., 2017), while for others ATO represents a measure of productivity (GE, XU, 2021; XU, LIU, 2020; OPPONG, PATTANAYAK, 2019; BAYRAKTAROGLU, ET AL., 2019; KOMNENIĆ, POKRAJČIĆ, 2012; FIRER, WILLIAMS, 2003). Some scholars consider ATO as a financial performance indicator (WEQAR, ET AL., 2020), while others consider it as a corporate performance indicator (FIRER, WILLIAMS, 2003). Sometimes, Employee Productivity (Pre-tax income/number of employees) is also used as an indicator of productivity (OPPONG, PATTANAYAK, 2019; CLARKE, ET AL. 2011).

While some scholars consider the market to book (MB) as a market performance indicator, others consider it as a market value indicator. (FIRER, WILLIAMS, 2003; GE, XU, 2021; XU, LIU, 2020). Some scholars only use Tobin's Q as a market performance indicator (HAMDAN, ET AL, 2017), while some use both indicators to assess the corporate value. (TSENG, JAMES GOO, 2005)

In the studies exploring the impact of IC on financial performance, most researchers actually explore the impact of IC on profitability. But some scholars introduce productivity (WEQAR, ET AL., 2020) and market value (XU, LIU, 2020) as categories of financial

performance as well. We do not dispute that exploring the impact of IC on productivity and market value could be very useful. However, increasing productivity increases profitability, while profitability, ie anticipated profitability determines the company market value.

Therefore, we support Forte et al. (2019) who investigated the effects of IC on profitability, growth in revenues and productivity, and only consider profitability and growth in revenues as measures of financial performances. However, some scholars, such as Bayraktaroglu, et al. (2019) use an indicator of productivity and market value as a measure of a firm's performance, thus making a distinction between financial performance and firm performance.

We strongly believe that the term "financial performance" in future will be reduced on profitability as the consequence that according to the new IASB's Conceptual Framework which is in use in approximately 120 nations and 90 countries (https://www.ifrs.com/ifrs_faqs.html) the former "Statement of comprehensive income" (former Income statement) has been called "Statement(s) of financial performance". (IASB, 2018) In the first IASB's Conceptual Framework (1989), the term "Financial performance" refers as well to Income Statement items, but changing the name of the statement will have a broader impact on the understanding of what financial performance is.

Therefore we can conclude that sometimes an indicator is called differently, but sometimes an indicator with the same name is calculated differently, as well scholars understand the term "financial performance" differently.

As has been shown, the vast majority of performance indicators are in the form of a ratio. However, absolute values are also used. Xu and Wang (2019) and Xu and Li (2019) used EBIT, Jordão and Almeida (2017) used EBITDA, while Ge and Xu (2020) and Dzenopoljac, et al. (2017) used both measures. Janošević et al., 2013 used net profit, operating profit and operating revenues. Petković, et al. (2020) also used operating profit and net profit. Lee and Lin (2019) used performing business revenue (PBR), non-performing business revenue (NPBR) and other non-performing business revenue, while Le and Nguyen (2020) used the pre-provision profit in the banking industry.

If IC has an impact on financial leverage and loan terms, what is likely, the use of net profit and ROE as measures of profitability is justified. On the other hand, if the impact of IC on financial leverage and loan terms is not significant, the study's results remain blurred by factors from the domain of financial management that have nothing to do with IC. However, as has been shown, some scholars use several additional metrics to assess a company's financial performance, such as revenue growth (Forte, et al. 2019), which is quite reasonable.

This is the first study exploring the effect of intellectual capital structure on the financial performances of fishing companies in an EU country. Recently Xu and Zhang (2021) explored the impact of IC on Chinese shipping companies and found that human, relational, and innovation capitals have an inverted U-shaped relationship with ROA, while the quadratic relationship between structural capital and ROA is not significant. They also found that physical capital has a U-shaped relationship with ROA.

3. Data Sample and Methodology of the Research

The study is based on the financial information gathered from the financial database "Diane" provided by Bureau Van Dijk, Moody's analytics company. It comprises financial information from the financial statements of French fishing companies during the period 2015-2019. The sample is only including large size fishing companies with all required variables. The starting data sample contains 398 French fishing companies. After a reduction of 109 that did not have all the required financial information, the final sample is composed of 289 companies.

Table 1: Sample of Companies

Table of Sample Companies	
Starting Number of Observed Companies	398
Companies With Uncompleted Data	109
Final Sample of Companies	**289**

Many previous studies proved a positive relationship between intellectual capital and a company's financial performance by using the VAIC method (KAMATH, 2004; CHEN, ET AL., 2005B; JOSHI, ET AL., 2013; CHU, ET AL., 2011; PAL, SORIYA, 2012; TAN, ET AL., 2007; PULIC, 1998, 2000; TSENG, JAMES GOO, 2005; YALAMA, COSKUN, 2007; ZÉGHAL, MAALOUL, 2010; PETKOVIĆ, ET AL., 2020). Also, there are studies that proved no link between intellectual capital, VAIC™ and company performance, but the components of VAIC™ showed different results (CLARKE, ET AL., 2011; CHU, ET AL., 2011; GAN, SALEH, 2008). Huang and Hsueh (2007) showed that there are different strengths of relationship among intellectual capital components, where structural and relational capital has better performance, whereas human capital has the poorest performance.

However, Muhammad and Ismail (2009) found that there is no significant relationship between human and structural capital, and company performance.

Value Added Intellectual Coefficient (VAIC™) is a method developed by Pulic (2000). This method calculates intellectual capital based on the accounting information that is possible to be found in financial statements. This method provides the value creation efficiency and produces added value to the company based on intellectual capital or intellectual resources (STÅHLE, ET AL., 2011).

- Human Capital (HC) is presented as employee expenses. Human Capital Efficiency (HCE) is calculated by dividing Value Added (VA) by Human Capital (HC);
- Structural Capital (SC) is a difference between produced Added Value (VA) and Human Capital (HC). Structural Capital Efficiency (SCE) is calculated by dividing Structural Capital (SC) by Added Value (VA);
- Capital Employed (CE) is interpreted as Financial Capital. Capital Employed Efficiency (CEE) is calculated by dividing Added Value (VA) by Capital Employed (CE);
- Value Added Intellectual Coefficient VAIC™ is a sum of HCE, SCE and CEE.

VAIC™ measures how much of the new value was created from the invested monetary unit. Capital Employed Efficiency (CEE) shows how much of the new value was created from investments in capital employed. Human Capital Efficiency (HCE) shows how much value was added by one unit invested in employees. Structural Capital Efficiency (SCE) shows the value added efficiency of structural capital (GAN, SALEH, 2008). VAIC™ is an easy method for calculations. It is standardized and very consistent, and enables effective comparative analyses across different companies and countries (FIRER, WILLIAMS, 2003).

VAIC = HCE + SCE + CEE

VAIC = ICE + CEE

VA = OP + EC + A + D

HCE = VA/HC

SCE = SC/VA

ICE = HCE + SCE

CEE = VA/CE

where:

VA - Value Added

OP – Operating Profit

EC – Employee Costs

A – Amortization

D – Depreciation

HCE – Human Capital Efficiency

HC – Human capital

SCE - Structural Capital Efficiency

SC – Structural capital (all related intangible assets values)

ICE – Intellectual Capital Efficiency

CEE - Employed Efficiency

CE - Capital Employed

VAIC - Value Added Intellectual Capital

4. Variable Description and Hypotheses development

The main variables in the research conceptual framework are coming from the previous explanation of the Value Added Intellectual Coefficient (VAIC™). The dependent variables are Operating Profit and Net Income, whereas the independent variables are Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE), Capital Employed Efficiency (CEE), and Value Added Intellectual Capital (VAIC) (Pulic, 2000). All variables are calculated on average (KUJANSIVU, LÖNNQVIST., 2007). In the study, the model of transformation of intellectual capital developed by Molodchik, Shakina and Bykova (2012) was implemented. The selected model does not require control variables.

The main objective of the study is to explore how intellectual capital and its components influence the financial performance of French fishing companies? The research goals came from the main goal: Insight in the effect of intellectual capital structure on financial performance.

- Investigate how the intellectual capital efficiency impacts on companies' Operating Profit and Net Income;

- Investigate how the intellectual capital components efficiencies calculated in the forms of Human Capital Efficiency (HCE), Structural Capital Efficiency (SCE) and Capital Employed Efficiency (CEE) impact companies' Operating Profit and Net Income;

In the study, the following hypotheses are tested:

H1: Intellectual Capital Efficiency seen in the form of the Value Added Intellectual Capital (VAIC) of French fishing companies improves the Operating Profit;

H1.1: *Human Capital Efficiency (HCE) impacts positively on companies' Operating Profit;*

H1.2: *Structural Capital Efficiency (HCE) impacts positively on companies' Operating Profit;*

H1.3: *Capital Employed Efficiency (HCE) impacts positively on companies' Operating Profit;*

H2: Intellectual Capital Efficiency seen in the form of the Value Added Intellectual Capital (VAIC) of French fishing companies improves the Net Income;

H2.1: *Human Capital Efficiency (HCE) impacts positively on companies' Net Income;*

H2.2: *Structural Capital Efficiency (HCE) impacts positively on companies' Net Income;*

H2.3: *Capital Employed Efficiency (HCE) impacts positively on companies' Net Income;*

5. Research Results

5.1. Research models

The research models (1)–(2) examine the relationship between intellectual capital and its components, and Operating profit as financial performance in the French fishing companies sample.

$$OPRO_{i,t} = \beta_0 + \beta_1 VAIC_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$OPRO_{i,t} = \beta_0 + \beta_1 HCE_{i,t} + \beta_2 SCE_{i,t} + \beta_3 CEE_{i,t} + \varepsilon_{i,t}$$

(2)

On the other side, the models (3)–(4) are utilized to examine the relationship between intellectual capital and its components, and Net Income as a financial performance in the French fishing companies sample.

$$NINC_{i,t} = \beta_0 + \beta_1 VAIC_{i,t} + \varepsilon_{i,t}$$

(3)

$$NINC_{i,t} = \beta_0 + \beta_1 HCE_{i,t} + \beta_2 SCE_{i,t} + \beta_3 CEE_{i,t} + \varepsilon_{i,t}$$

(4)

where i=1, …n and t=1, … t represents firm and year, respectively; ε denotes the disturbance.

5.2. Descriptive statistics

Table 2 presents the descriptive statistics of the selected sample. The mean values of dependent variables are 0.0345785 and 0.0808351 respectively for Operating profit and Net Income. The mean value of the VAIC variable is 5.836436. The mean values of independent variables are 1.719408, -0.121048 and 3.414773, respectively for variables HCE, SCE and CEE. Capital Employed component has the greatest mean value, compared to Human and Structural. This is consistent because capital employed is the most effective driver of value creation processes.

Table 2: Descriptive statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
HCE	289	1.719408	2.666311	-5.07343	37.56205
SCE	289	-0.121048	2.887611	-56.25483	3.183123
CEE	289	3.414773	61.23115	-374.4041	1068.074
VAIC	289	5.836436	66.43104	-373.2706	1069.26
OPERAPROFIT	289	0.0345785	0.2270987	-1.105534	2.017695
NETINCOME	289	0.0808351	0.3974391	-1.836159	4.187474

Source: Authors' calculation

5.3. Correlation analysis

The results of the correlation analysis are in Table 3 below. Table 3 shows that Operating profit correlates positively with HCE only, whereas with SCE, CEE and VAIC the correlations are negative. For the Net Income, correlations are positive together with HCE and SCE, whereas the negative correlations exist with CEE and VAIC. These correlation results will be taken into consideration in multiple regression analysis.

Table 3: Pearson Correlation

	HCE	SCE	CEE	VAIC	OPERAPROFIT	NETINCOME
HCE	1					
SCE	0.0602	1				
CEE	-0.061	0.0051	1			
VAIC	0.0369	0.0542	0.9980	1		
OPERAPROFIT	0.0595	-0.0347	-0.0035	-0.00028	1	
NETINCOME	0.1192	0.0115	-0.0072	-0.0041	-0.0435	1

Source: Authors' calculation

5.4. Regression analysis

The regression analysis results are shown in Table 4. Model (1) proves a negative impact of VAIC on the companies' Operating Profit. The given results are not consistent with previously examined results in our study. Hypotheses 1 is not confirmed.

In model (2), there is a positive impact of HCE on the companies' Operating Profit, whereas SCE and CEE impact negatively. The hypothesis 2 is partly confirmed.

In model (3), there is a slightly negative impact of VAIC on the companies' net income, which not confirms the hypotheses 3.

The final model (4) shows similar results like model 2, where the variables HCE and SEE impact positively, where on the other side, CEE impacts negatively on the companies' net income. Also, the hypothesis 4 is partly confirmed.

Table 4: Regression results of models (1)-(4)

Variables	Model (1)	Model (2)	Model (3)	Model (4)
Constant	0.03681	0.02950	0.09192	0.06082
VAIC	-8.7406	-	-0.00025	-
HCE	-	0.00478	-	0.01820
SCE	-	-0.0469	-	0.00080

CEE	-	-9.6606	-	-0.06082

Source: Authors' calculation

6. Discussion about Findings

Intellectual capital is a strategic resource that creates a company's long-term competitive advantage. The paper examines the efficiency of intellectual capital (VAIC) and its components (HCE, SCE, CEE) on the final results (operating profit and net income) with a special focus on French fishing companies. The investigation is based on financial information from a five-year period.

In both models (1) and (3), VAIC had a negative impact on operating income and net income, respectively, indicating that the value does not come from total intellectual capital. The applied model indicates that value created from intellectual capital does not improve the operating profit and net income of French fishing companies.

On the other side, in models (2) and (4), the results are different. Model 2 shows that HCE is positively influenced by the chosen dependent variable, indicating that human capital improves operating profit. In the traditional sense, this indicates that human and employees' knowledge, skills, experience and competencies improve French fishing operating profitability indicators. But it could be explained as well by the way that the numbers of employees and their salaries have a significant impact on the profitability of this industry.

Model 4 shows that HCE and SCE influence positively the IC means that human potential together with the company's capital, values, culture and systems

Model 4 shows that HCE and SCE positively influence the net income. This means that the human potential, as well as the capacities, capital, values, culture and systems, improve the company's net income.

7. Conclusion

Fisheries are complex socio-ecological systems with many feedbacks, linkages, and couplings between biophysical, ecological, and human components (Thanassekos, & Scheld, 2020; Garcia, & Charles, 2008) Therefore numerous papers explored the social, economic, and biological implications of fishing, while some of them tried to discover the linkage between different aspects.

This study examined whether intellectual capital improves a company's financial performance. We use the French fishing industry to investigate this issue. The research covered in a total of 289 French fishing companies over the period from 2015 to 2019. For the purpose of this study, four regression models were developed in order to provide the empirical investigation of the correlation between intellectual capital and its components, and companies' earnings.

Results from this research show the efficiency of the companies' intellectual capital and its components. These results indicate that employee expenses influenced the financial performances of French fishing companies, as well as the companies' potential, capacity and capital of the companies.

Bearing in mind that some states have adopted quota allocation mechanisms, while various quota allocation mechanisms have a different impact on the profitability of the fishing industry, we strongly encourage exploring the influence of introducing various quota allocation mechanisms on the efficiency of intellectual capital in this industry. Namely, as reported by Dupont, Fox, Gordon, and Grafton (2005), the introduction of Individual Transferable Quotas (ITQs) in Canada has as a consequence that vessels have enjoyed increases in the prices received for those fish species that are included in the quota program, while the larger vessels have benefited the most from it. With respect to longer-term impacts, the transferability provisions of the ITQ program have encouraged exit and more efficient operations to prevail. (DUPONT, ET AL, 2005). Ekerhovd and Gordon (2020) explored the effect of the introduction of the Rights Based management system in Norway with individual vessel catch quotas assigned to all major fish species and found that capital investment was largely independent of vessel quota allocation. They also found that recognizing the financial value of licenses provided the incentive to upgrade the purse seine fleet, whereas, the increase in fleet capacity was a secondary unintended effect of the policy. (EKERHOVD, GORDON, 2020)

We also encourage exploring the impact of intellectual capital on profitability ratios, productivity, and market performance of fisheries.

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