Intellectual Capital and Company Performance: Evidence from European FinTech Companies

Filomena Izzo[1], Viktoriia Tomnyuk[1], Giuseppe Varavallo[2]

[1] Department of Economics, University of Campania "Luigi Vanvitelli", Capua(CE), Italy

[2] Fondazione LINKS – Leading Innovation & Knowledge for Society, Torino, Italy

Correspondence: Filomena Izzo, University of Campania "Luigi Vanvitelli", Capua (CE), Italy.

Abstract

The scope of this study is to examine the impact of Intellectual Capital (IC) on the performance of European FinTech companies. Despite numerous studies conducted to measure the IC, only a few of these explore the impact of IC in dynamic and technological markets. This study intents to contribute to the existing literature by examining a completely new sample of companies that operate in the condition of Industry 4.0. This paper uses data of 12 European Fintech companies from 2016 to 2018, listed in the Dealroom global database. This research employs the Value Added Intellectual Coefficient (VAIC) model proposed by Pulic to measure Intellectual Capital. To obtain accounting information, the authors utilised the Amadeus Bureau van Dijk database.

1. Introduction

Over the last decennary, a continued advancement founded on new digital technologies has been affecting the entire society by guiding to the diffusion of a digital economy (Gandomi & Haider, 2015; Raguseo, 2018; Diebold, 2018). We are at the establishment of the fourth industrial revolution, is described by the incorporation of physical activities with new digital ones, from the usage of data in sustain of the industrial activities to the optimization in the implementation of working procedures (Valerdi, 2017; Al-Barznji & Atanassov, 2017).

In this business condition, knowledge-based competition has grown into the core lead for economic development (Krstic & Bonic, 2016; Vale et al., 2016; Roos, 2017; Lee & Wong, 2018). In order to survive over an ever-changing condition, businesses change their strategies from labor-based business to knowledge-based business (Sadalla and Marlina, 2018). As a consequence, IC is a view as the principal sources of a firms competitiveness wealth in this economy era (Petty & Guthrie, 2000; Petty & Guthrie, 2000; Marr et al., 2003; Vaz et al., 2015; Roos, 2017; Popkova, 2019). Intellectual Capital includes knowledge, culture, skills, and process strategy that generate value and facilitate the firm to attain its aims (Teece, 2000; Reed et al., 2006;Hsu et al., 2009, Albertini,2016). More studied underline Intellectual Capital as a concealed resource that produces the economic value and influences remarkably the level of competition and success of a business (Ginesti et al., 2018; Marzo & Scarpino, 2016; Gogan et al., 2016). An enterprise that converts their human, structural and relational capital, which are the components of IC, into information will open its doors to innovations and achieve the ability to act proactively (Fidanbas & Irban, 2019).

Scholars have investigated the relationships between Intellectual Capital and companies' performance (Meles et al., 2016; Ginesti et al., 2018). Despite numerous studies conducted to measure the IC, just a small number of these study the impact of IC in dynamic and technological markets (Dženopoljac et al.,2016). This study aims to support the existing literature by examining a completely new sample of companies that operate in the condition of Industry 4.0.: European fintech companies.

Our paper contributes to the literature in that, it offers comprehension of how-to asses Intellectual Capital performance in the European Fintech companies. Furthermore, it recognizes the potential position of Intellectual Capital in fintech company business performance in Europe. This study additionally supports policymakers in attaining their economic stability goal in 4.0 economic Era.

The rest of this paper continues as follows. The ensuing section provides a literature review. Section 3 presents the data, definitions of the variables, and the research methodology. Section 4 offers empirical results of the

analysis. Section 5 provides discussion, conclusion, and futures research direction.

2. Literature Review

The notion of Intellectual Capital is still a topic of current debate for numerous motives. It has no commonly recognized definition, as it is debated in different fields and from diverse viewpoints, comprising economics, strategy, accounting, human resources, marketing, and communication (Lee & Wong, 2019).

Numerous researches have been conducted to investigate the concept of IC in different industries and countries (Sveiby, 1997; Bontis, 1998; Lev. 2000; Sharabati, 2010; Dženopoljac, 2016).

From the literature, the notion of IC is defined by scholars in numerous ways. Edvinson and Malone (1997) described Intellectual Capital as the ownership of knowledge, skills, customer relationship, strategy, and professional skills that lead added values to the firm. Sullivan (1999) described Intellectual Capital as the knowledge that can be transformed into profit. Herman (2010) defined it as a set of critical skills owned by employees. In numerous cases, Intellectual Capital seems to be vital for the decision making of the firms, and it is the only asset that appreciates over time instead of depreciating (Alhassan and Asare, 2018; D'egidio, 2006).

However, the major scholars agree that IC is composite by three major elements: human capital, structural capital, and relational capital (Subramaniam & Youndt, 2005; Bjurstrom & Roberts, 2007).

Human capital refers to people who are part of a firm, especially the knowledge these persons have (White, 2007). Commonly, it refers to the tacit knowledge, such as experience, loyalty, culture, and education that exist in every worker of a firm (McGregor et al., 2004; Tsui et al., 2014). *Structural capital* is recognized as organizational capital, which includes the organization's procedures, databases, documentation service systems, and other types of codified knowledge (Ting and Lean, 2009; Marzo & Scarpino, 2016). *Relational capital* refers to interactions of the company with the external environment; it also comprehends the company's brand, customer loyalty, and corporate reputation (Jayawarna et al., 2014).

IC must be well-comprehended and right managed in companies that it wants to compete effectively in the modern economy. For this reason, to manage the IC well, it is essential to measure and evaluate its performance and improving it regularly. The measurement of Intellectual Capital represents a critical activity for the decision-making process and for the formulation of strategies inside the firms (Roos et al., 2005; Thorleifsdottir and Claessen, 2006). It will, therefore, be even more decisive in the future because of the more competition brought by the development of the fourth industrial revolution.

This study employs the Value Added Intellectual Capital model, which was proposed by Pulic (1998) to measure Intellectual Capital because of its benefits (Iazzolino & Laise, 2013; Tran & Vo, 2018). The proposed model is based on the estimate of value added (VA), human capital (HC) structural capital (SC) and capital employed (CE), and has the aim of measuring the capacity of a firm to create value-added thanks to the efficient use of its intellectual capital (Capuano, 2010).The principal advantage of the method is to be founded on public information attainable from the financial statements.

The VAIC model has been extensively tested in various contexts (Ting and Lean, 2009; Celenza et al., 2014) and has been extensively used to measure the relationship between IC and corporate performance of the companies. Joshi et al. (2013) employed the VAIC method to test the effect of Intellectual Capital on financial performance, identifying the Human Capital as the most significant component. Alhassan and Asare (2016) investigate the influence of IC on efficiency in the banking industry in Ghana from 2003 to 2011 using the VAIC model. The author's discovery that VAIC and its elements except for SCE (Structural Capital Efficiency) are positive and significantly linked to variations in productivity. Ginesti et al. (2018) examine the relationship between IC and corporate performance of 452 non-listed Italian companies, proving a positive relationship of VAIC, CEE and SCE with measures of financial performance.

The large body of literature has examined the relationship between IC and the performance of firms operating in traditional sectors, especially in the financial sector. However, only a limited number of these have studied IC in knowledge-intensive industries. Gan and Saleh (2008) examine the relation between Intellectual Capital and financial performance of technological firms in Malaysia, discovering that the firms still depend on CEE (Capital Employed Efficiency). Dženopoljac et al. (2016) study of Serbian ICT firms during 2009-2013, discovered that only Capital Employed Efficiency had a considerable influence on corporate performance. However, no study so far has studied the impact of IC in Fintech companies, most likely because Fintech market is a very recent market.

2.1 Research Hypotheses

Based on these argumentations we propose to test the following two hypotheses:

H1. There is a positive relationship between VAIC and Fintech companies' performance.

H2. There is a positive relationship between VAIC components and Fintech companies' performance.

3. Method

3.1 Overview of the FinTech European Sector

In the context of the Industry 4.0, new businesses developed. Through the application of enabling technologies such as Blockchain, the Internet of Things, and Artificial Intelligence have entered new players in the financial market, creating a completely new sector, that of Financial Technologies Companies (FinTech).

Fintech is a new financial sector that employs technology to improve financial activities as opposed to traditional financial institutions (Schueffel, 2017). The term "FinTech" is a neologism that derives from the words "financial" and "technology" and generally explains the union of modern Internet technologies, with traditional business activities of the financial services industry (Gomber et al., 2017). Financial technology companies are both startups and established financial institutions, and technology firms attempting to change or improve the use of financial services offered by existing financial institutions. Financial technology has been employed to automate trading, banking services, and risk management (Aldridge & Krawciw, 2017). Fintech operates in the following area: payment, money management, lending, wealth & asset management, insurtech, regtech, and tech enabler.

In recent years, the FinTech sector has had a steady development all over the world. Dealroom data report (2019) shows that since 2013 European Fintech companies have created over 2x more value than any tech sector (software, gaming, food, transportation, music, travel, health). In Europe, both realized and current pipeline of private startups (euro 128 B).

European fintech investment ($5.1B) recently surpassed Asia ($2.2B) and is not that far from the USA ($7.5B). However, with the introduction of the European regulation on digital payments (PSD2), European FinTech companies will be able to take advantage of particularly valuable information for free, hitherto held exclusively by banks. Consequently, the European FinTech will be able to accelerate the growth of competition significantly.

The development of the FinTech market is promoted not only by new startups but also by big Internet giants (Google, Apple, Facebook, Amazon), which are gradually expanding its range of activities in the financial sector. Facebook, for example, has recently obtained one e-money (Libra) license in Ireland.

3.2 Measurement of IC

Following Pulic (2000), Intellectual Capital value can be determinate through the VAIC method (Value Added Intellectual Coefficient). This method is based on accounting information, which is objective and verifiable. VAIC calculates the efficiency of physical, human, and structural capital. The model is measured as follow:

$$VAIC=[(VA/HC)+(SC/VA)]+VA/CE \qquad (1)$$

HCE =VA/HC   where VA=value added and HC= total salaries and wages.

SCE=SC/VA   where VA=value added and SC= structural capital for the company.

CEE=VA/CE   where VA=value added and CE= book value of the net assets of the firm.

The VAIC model was employed in numerous studies (Ting & Lean, 2009; Celenza et al.,2014). Scholars have investigated, in particular, the relationships between IC and company performance (Meles et al., 2016; Ginesti et al.,2018). Despite numerous studies conducted to measure the IC, just a limited number of these explore the impact of IC in dynamic and technological markets (Dženopoljac et al., 2016).

By analyzing the impact of Intellectual Capital on companies' performance, VAIC and its elements are independent variables. Return on assets (ROA) is used as a performance indicator of companies.

Table 1. Variables Description

Variables	Description
ROA (return on assets)	Indicator of financial performance
VAIC (value added intellectual coefficient)	The sum of HCE, SCE and CEE
HCE (human capital efficiency)	Indicator of value-added efficiency of human capital
SCE (structural capital efficiency)	Indicator of value-added efficiency of structural capital
CEE (capital employed efficiency)	Indicator of value-added efficiency of physical capital

3.3 Regression Models

This study implements a regression model, testing the relationship between IC and corporate performance. Model (1) analyze the impact of VAIC on companies' corporate performance and model (2) analyze the impact of VAIC components on the company's corporate performance.

$$\text{Model 1:} \quad ROA = \beta_0 + \beta_1 VAIC + \varepsilon, \tag{2}$$

$$\text{Model 2:} \quad ROA = \beta_0 + \beta_1 HCE + \beta_2 SCE + \beta_3 CEE + \varepsilon. \tag{3}$$

3.4 Data

This study utilizes data of 12 European financial technology companies from 2016 to 2018, listed in Dealroom global database (providing analytics on startups and venture capital investment). To obtain accounting information, the authors used the Amadeus Bureau van Dijk database. The sample of data was obtained after a selection of only companies with available information for each of the variables listed in Table I. Moreover, the financial technology sector is extremely newly established, and only a few numbers of companies provided data from 2016 to 2018.

4. Results

Table 2 shows the mean values of each dependent and independent variables for the year 2016 to 2018. The first part of Figure 1 shows the composition of VAIC from 12 companies from 2016 to 2018. This first representation is evidence that the component of Human Capital has a higher value for the majority of companies across other components of the VAIC model. The second part of Figure 1 describes VAIC range and how each component of value contributes to forming the final value of VAIC for the 12 FinTech companies.

Table 2. Results from VAIC calculation of 12 European FinTech (2016-2018)

HCE	SCE	CEE	VAIC	ROA
2.68	0.62	0.69	3.99	26.28
3.62	0.72	0.38	4.72	6.41
2.21	0.54	0.95	3.71	11.86
3.67	0.72	0.92	5.32	30.86
1.77	0.43	0.82	3.02	18.40
0.19	-6.49	0.27	-6.03	-32.92
6.91	0.85	2.22	9.99	65.10
1.60	0.37	1.33	3.30	8.57
-0.28	1.42	0.54	1.67	-44.37
0.32	0.65	0.23	1.20	-11.12
-2.05	1.53	-0.40	-0.92	-58.29
1.10	0.09	8.51	9.70	17.17

Figure 1. VAIC composition

Before moving on to the regression analysis, it is useful to perform descriptive statistics of the observed variables. In particular, Table 3 shows the minimum, the maximum, the standard deviation, the median, and the average of all the variables taken into consideration for the analysis.

Table 3. Descriptive statistics

Variables	Nr of Firms	Minimum	Maximum	Mean	Median	Std.deviation
HCE	12	-2.05	6.91	1.81	1.68	2.30
SCE	12	-6.49	1.53	0.12	0.64	2.12
CEE	12	-0.40	8.51	1.37	0.75	2.34
VAIC	12	-6.03	9.99	3.31	3.50	4.31
ROA	12	-58.29	65.10	3.16	10.21	34.67

Table 4 shows the results of the correlation matrix between variables, using Spearman's correlation analysis. Our findings reveal a significantly positive relationship between VAIC and ROA. Also, the outcomes illustrated in Table 4 show that HCE has a high correlation with ROA, and a significative relationship between CEE and ROA, while SCE show a no significative value. This means that investment in Structural Capital in FinTech companies is no impact significantly on their financial performance.

Table 4. Correlation Matrix for HCE, SCE, CEE, VAIC and ROA

	HCE	SCE	CEE	VAIC	ROA
HCE					
SCE	0.05				
CEE	0.53	-0.34			
VAIC	0.81	0.05	0.77		
ROA	0.86	-0.15	0.72	0.80	

The results of regression models are presented in Table 5 and in Figure 2. Model (1) examines the effects of VAIC on ROA. The results reveal a positive relationship between two variables. The estimated coefficient is 6.276 (p-value = 0.002), and the Adjusted R-squared is 0.57, this indicates that the model explains 57% of the variation in ROA. Therefore, we can confirm the previous hypothesis H1: There is a positive relationship between VAIC and the Fintech company's financial performance. This result confirms the findings of previous studies, for example Ginesti el al. (2018) and Ting & Hooi (2009).

Model 2 examines the effects of each component of VAIC model on ROA. Table 5 reveals mixed results. Human Capital Efficiency results in a better predictor of company performance with an estimated coefficient of 13.123 and associated p-value = 0.000. Structural Capital Efficiency with an associated coefficient of 1.570 and p-value = 0.60, demonstrated a non-significant relationship with ROA indicator. Capital Employed Efficiency with an estimated coefficient of 3.437 and p-value = 0.085; this means that HCE and CEE are better indicators of company performance. Moreover, the Adjusted R-squared of 0.849 of model 2 suggests that this result is significantly robust.

Table 5. Regression models

Variables	Model 1		Model 2	
	Coefficient	p-value	Coefficient	p-value
VAIC	6.276	0.002(**)		
HCE			13.123	0.000(**)
SCE			1.057	0.600
CEE			3.437	0.085
R^2_Adj	0.570		0.849	

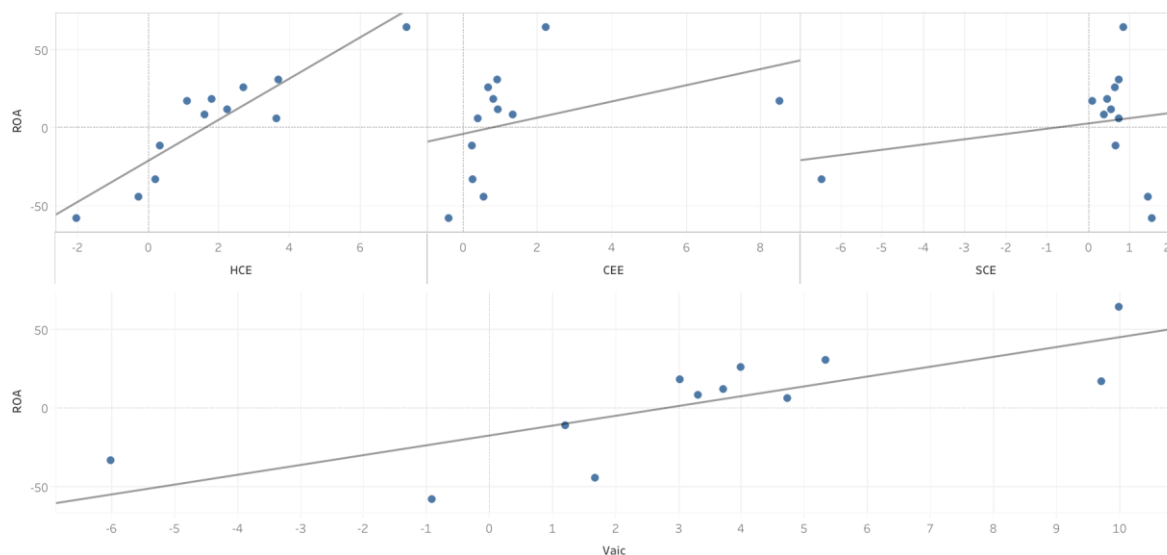*Note.* (**) Significance level p-value<0.01.

Figure 2. Model 1 and Model 2 regression plots

5. Discussion and Conclusion

More studies conducted to measure the IC, just a small number of these investigate the impact of IC in dynamic and technological markets. Our study aims to influence this flow of research by examining a completely new sample of firms that operate in the conditions of Industry 4.0: European fintech companies.

Furthermore, this study provides to comprehending the causal relationship between Intellectual Capital components and the performance of a sample of European Fintech companies, implementing Value Added Intellectual Coefficient (VAIC) model, and evaluating corporate performance.

Results propose that firms concerned in realizing good performance must strengthen their attentiveness to their Human Capital, through a strategy of valuation of employees' abilities, skills, and experience.

All these outcomes are reliable with the majority of literature that regards the crucial significance of leverage the Intellectual Capital for generating firms' value.

This study might be of awareness to policymakers and shareholders, as it supports to assess how and under what conditions proficient usage of Intellectual Capital components might create value for the competitiveness of firms.

This study, moreover, proposes innovative awareness for managers in order to recognize which aspects are critical for attainment profitability in the 4.0 Technology Era.

Therefore, we suppose that companies with inferior productivity put more and more exertion into obtaining value from the management of the components of Intellectual Capital.

This research has some limits. First, the study focuses on the European level. Future studies could be extended to Asia and the USA market. Second, the outcomes of this research must be taken prudently, pondering the well-known limits that influence the Pulic's method. Third, the study has used only ROA as an indicator of companies' financial performance. More indicators can be involved to analysis the relationship between Intellectual Capital and companies' profitability.

Potential future extension of this research could examine more components of IC, such as Innovation Capital and Relational Capital, these components can capture more information from the external and internal environment. The scholars are invited to test alternative methodological frameworks to calculate IC components and offer a new point of view in this stream of research.

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