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Is intangibility a rewarding strategy? A study on European shareholders returns from 1999 to 2019

Resource Based View (RBV) and Dynamic Capability approach states that the use of resources within a company is strategical in creating value. As an innovative methodological contribution, a machine learning technique on behalf a predictive proxy was used for generating the Total Shareholder Return (TSR) trends in the European non-financial companies quarterly base data, from 1999-2019. The panel data analysis results bring new insights. The question is not Tangible or Intangible anymore but the nature of Intangibility that is deterministic for the TSR. Therefore, not only Intangible Assets, but Capital Expenses, Administrative Costs, Advertisement, Research and Development and EBITDA were fundamental to create value to TSR. These results are important for management conclusions, both practical and academic, in order to review the current notion of 'expenses' elevating them to a strategical role in value creation in the architectural company's structure.

Keywords: Intangible assets; Resource Based View; Total Shareholder Return; Dynamic Capability; Machine Learning.

A intangibilidade é uma estratégia recompensadora? Um estudo sobre os retornos dos acionistas europeus de 1999 a 2019

A visão baseada em recursos (RBV) e a abordagem de capacidade dinâmica afirmam que o uso de recursos dentro de uma empresa é estratégico na criação de valor. Como contribuição metodológica inovadora, foi utilizada uma técnica de aprendizado de máquina em nome de uma proxy preditiva para gerar as tendências do Total Shareholder Return (TSR) nos dados de base trimestral das empresas não financeiras europeias, de 1999-2019. Os resultados da análise de dados em painel trazem novos insights. A questão não é mais Tangível ou Intangível, mas a natureza da Intangibilidade que é determinística para o TSR. Assim, não só os Ativos Intangíveis, mas as Despesas de Capital, Custos Administrativos, Propaganda, Pesquisa e Desenvolvimento e EBITDA foram fundamentais para criar valor à TSR. Esses resultados são importantes para conclusões gerenciais, tanto práticas quanto acadêmicas, a fim de revisar a noção atual de 'gastos' elevando-os a um papel estratégico na criação de valor na estrutura da empresa de arquitetura.

Palavras-chave: Ativos intangíveis; Visão baseada em recursos; Retorno Total ao Acionista; Capacidade Dinâmica; Aprendizado de Máquina.

Topic: **Finanças Empresariais**

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INTRODUCTION

Intangible assets have been defined by many authors as non-monetary assets or assets without physical substance (MERITUM, 2002; LEV et al., 2003), and can be considered difficult to measure due to limitations in accounting records (PETTY et al., 2000; MOURITSEN et al., 2001), but add exponential value in the value creation (HOLLAND, 2003), mainly in a transition from an industrial-based economy to an economy supported by knowledge (BARTH et al., 1998; KALLAPUR et al., 2004), thus, intangible assets have allowed the companies' competitive advantage and the shareholder's return, or Total Shareholder Return, (TSR) (AAKER et al., 1994; HAANES et al., 2000; GROSS, 2001).

Works such as those by Barney (1991), Dyer et al. (1998), Joia (2000), Stewart (1999; 2003) and Peteraf et al. (2003), among others, associated a company's intangibles with its competitive advantage and business strategy. There are also studies that showed intangible assets as important resources and related to them with Resource Based View (RBV) (BARNEY, 1991).

In particular, Barney (1991) stated that the RBV theory considers that the company has tangible and intangible assets so that they provided continuum and competitiveness over time. These resources can be physical, such as machinery, buildings, industrial infrastructure, among others; and human resources such as qualified labor and organizational knowledge, among others. The interaction of these company resources in the environment that works on it, could create value to the point where there is a differentiation, or a gain of scale and scope. Additionally, Xiao et al. (2017) states that intangible assets bring a great competitive advantage and allow differentiation from other competitors specially in a globalized world in which companies expand their physical boundaries, through a resource-based view and internationalization.

In a globalized world, there is a need for companies to increasingly adapt to the external environment in order to create value and maintain competitive advantage. Dynamic Capability Theory emerged by pledging the need for integration, change, adjustment, construction and the re-engineering of the company's internal competences, to deal with the new demands of the external environment, as well as to recreate new and innovative forms of competitive advantage (LEONARD-BARTON, 1992).

Teece (2009) defined dynamic capabilities as the firm's ability to interact, build and reconfigure its internal and external competencies within the external scenario, using its competencies (routines and processes, performance, specific assets that are difficult to imitate) in relation to dynamics (quick changes in technology and market strengths). Intangible assets in the view of dynamic capability are fundamental for maintaining the firm's performance and competitive advantage (TEECE, 2007).

Value creation is generated by assets that provide a strategy and competitive advantage (PENROSE, 1959; WERNERFELT, 1984), resources that have the capability to generate economic growth (WERNERFELT, 1984; RUMELT, 1984). Both studies, of Surroca et al. (2010) and Vasconcelos et al. (2019) associated intangible assets and their influence on creating value for companies in different economic environments.

In parallel, Damodaran (2006) and Ross et al. (2016) claimed that intangible assets influence the value of companies, impact cash generation and enable competitive advantages that contribute to the value

creation. Rappaport (1999) classified value creation one of the main responsibility of managers, who, in turn, represent the shareholders' interests. In this sense, the value creation also occurs through the shareholder return.

For Young et al. (2000), an instrument for evaluating the company's performance is the Total Shareholder Return, TSR, which is applicable only to public companies, and has the advantage of including market expectations about future growth. The theme of intangibles lasts for a long time, either in periods of pre-convergence to IFRS, as well as in periods after IAS 38.

Due to accounting conservatism, many expenses that contribute to the formation of intangibles should be allocated as expenses, so in this study such expenses will be considered as determining factors of intangibility, even if it is not a practice allowed by IAS 38. This paper main contribution is to check if intangible contribute to a total shareholder return. More specifically, which variables the decision maker should focus to increase the TSR.

As a practical result of this research, the managers may focus on the variables that are fundamental to create a total shareholder return. Academically it brings a new line of development, instead of just focusing on the tangibility matter, to bring the attention to the underlying effects on the administrative structure in the discussion.

THEORETICAL REVIEW

The Transition: from Resource-Based View to Dynamic Capability Theory

The resource-based view is a theory focused mainly on the company's intrinsic factors, as it considers the company's internal environment to be the main competitive factor, differing from other theories that allocate exogenous factors to the company's performance.

Penrose (1959) have discussed and pointed the resource-based view, his assumptions already claimed that the company's existing resources overlapped with new resources, making up the company's tangible and intangible assets, focusing mainly on the company's internal environment as a driving force for the differential and strategic competitiveness. Each company is unique and has its structure according to its evolution over time. A development process, which confirms that its strength is linked to the way these resources were built and used, and not in relation to the external environment of the company.

In an expanded approach, Barney (1991) defined the resource-based view, is that the company uses its resources in order to obtain returns that are superior to those of its competitors. This creates a competitive advantage for customers because of creating value for their differentiated products and services. These strategic resources come from their tangible or intangible assets, which, combined, create value through strategic resources and capabilities that provide differentiated solutions to customers.

A company's resources and strategic capability are difficult to copy, non-replaceable and rare, so that the company that owns them, when combined, creates value for the products and services offered to customers, in relation to the same products and similar services provided by its competitors, maintaining its

competitiveness.

Barney (2003) stated that this value is intrinsically related to the customer's perception of the products and services offered, being predisposed to choose and pay to obtain it, in exchange for superior quality, price and performance, and seems more appropriate to your needs (ZUBAC et al., 2010).

Yet, a company has a competitive advantage in relation to its competitors when it has differentiated resources in relation to its competitors, as a consequence, they are able to provide differentiated products and services in relation to the other players in the market (PETERAF, 1993).

Peteraf (1993) also completed Barney's (1991) vision regarding strategic resources and a company and its competitive support; (i) heterogeneity; (ii) limits for ex post competition; (iii) immobility of resources and (iv) the limits for ex ante competition.

The heterogeneity indicates that the companies have their resources different from each other, mainly due to the development that each one performed in its resources, in this way, they have different resources and strategic capacities in relation to the other companies in the market; ex post competition limits refer to situations in which a company tries to imitate the competitive advantage of another company, causing an imperfect imitation or an imperfect replacement; imperfect mobility refers to the fact that several resources are available on the market, however, their ownership and use would differ from company to company due to the internal structure of each company and which would be jointly related to that resource; and the ex-ante limits are the resources that a company has, until the moment when no other company owns it, its competitive duration would occur even when a competitor could imitate, develop or buy a similar resource (PETERAF et al., 2003).

The Dynamic Capability Theory goes beyond the internal capability of the firm according to the resource-based view, it also considers the creation of maintaining the competitive advantage through how the firm develops and renews its competences (TEECE et al., 1997).

For Teece el al. (1997), creation and sustaining occurs due to the company's internal factors, as well as the dynamism of the environment; making a tripod: (i) processes: are the routines or patterns of current practices and learning; (ii) positions: are the assets, governance structure, consumer base and external relations with suppliers and partners; and (iii) trajectory: it is the history of technological and market decisions and opportunities. This tripod determines the essence of the firm's dynamic capability and its competitive advantage.

Intangible Assets: competitive advantage and value creation

The word strategy comes from the term strategia, which means plan, method, maneuvers or stratagems used to achieve a specific goal or result. Initially, to which the art of waging war was linked; currently its scope of use is broader, in addition to the military aspect, has incorporated economic, psychological and political meanings (FREEDMAN, 2015).

Strategy is the direction in the corporate scope, outlining the path to be taken in the long term of an organization aiming at obtaining competitive advantage through the use of its strategic resources and

capabilities. Companies obtain a competitive strategy only when they use their strategic resources, aimed at creating value in relation to their competitors, developing products and services that meet the needs of customers, and that they are willing to acquire them (JOHNSON et al., 2007).

Competitive advantage is the result of how much the company creates more economic value in relation to its competitors, due to the perception of value and how much the customer is willing to pay for a certain product or service (PETERAF et al., 2003).

It is important to emphasize that there may be a gap between the value that the company expects to attribute to its products and services, and the value that customers are in fact perceived by the customer, mainly because there are several subjective factors to the customer that impact their decisions, desires and necessities, such as marketing activities, psychological factors, society, among others (BOWMAN et al., 2000).

In previous studies, Vasconcelos et al. (2019) found that intangible assets generate EBITDA, and in turn impact on the companies' creation value and total shareholder return. According to Ludícibus (2017), EBITDA is a financial indicator widely used by fundamentalists, being essentially an operational and disregarding measure to the effects of financial results, not being a value that represents cash value, but rather showing the company's ability to generate operating cash or operating income.

Sirmon et al. (2007) explained that the value creation takes place when the company is able to align its expectations with the customer's and all stakeholder's expectations, so that it can meet its needs and in return the customer has the perception of the benefit of a certain product or service over another, and is willing to pay for it.

According to Barney (1991), for a resource to be considered strategic, it is necessary: (i) allows the company to protect itself from threats or seize opportunities; (ii) rare and difficult for competitors to obtain; (iii) impossible to be replaced by other resources and (iv) difficult to be copied by competitors. Only the ownership of tangible and intangible resources does not guarantee the company the value creation, but rather, how these resources are combined in order to meet the value creation, and allies with the external variables to which the company is susceptible; the internal factors of the company are manageable, whereas the external factors happen independently of the management, thus emphasizing the importance of internal resources in adapting for protection and use in opportunities in relation to the external environment (JOHNSON et al., 2007).

Intangible assets are fundamental factors for the competitive advantage of a company, improving performance and value creating; in general terms, RBV directly addresses the internal factors of the company, while other theories corroborate that business performance is linked to external factors, such as macroeconomics, microeconomics, the relationship with competitors, among others (XIAO et al., 2017). So, why not relate the endogenous factors to the exogenous ones trying to predict a more realistic forecast? Sirmon et al. (2007) were conniving with the line that it is important to manage both the company's internal variables, as well as its resources, expertise and also the corporate resilience in adapting to the external environment, especially in relation to its competitors.

Teece (2007) affirmed that the dynamic capability comes from the combination of the elements of

the RBV proposed by Barney (1991), Peteraf et al. (2003); and the neo-Schumpeterian view of the firm that associates the ideals of dynamics and innovation proposed by Schumpeter (1942) and the routine and competence presented by the firm's behavioral theory proposed by Cyert et al. (1963).

As reported by Teece (1986), dynamic capability is directly linked to competitive advantage, since the firm has assets and resources that distinguishes from others in the market, especially in relation to intangible assets, which becomes difficult to replicate; and has the integration of external know-how, learning, sharing and integration of knowledge.

The theory of dynamic capability incorporates the RBV assumptions view (TEECE, 2009), and the link of competitive advantage with the RBV occurs in the value creation, which comes from the company's ability to adapt in using its resources, which are its tangible and mainly intangible assets, such as: the brand, intellectual capital, patents, know-how, reputation of the company, among others; to meet and satisfy the needs of customers, their desires, purposes, needs and purchasing characteristics. Thus, creating value would be an important factor in the RBV perspective (ZUBAC et al., 2010).

While the RBV is attentive to the company's internal resources, the dynamic capability theory is seen as an integrating link to the RBV and competencies in understanding the creation and sustaining of the company's competitive advantage (LIN et al., 2014; MAKADOK, 2001; WU, 2010).

Predictive Factors

In order to improve the traditional models that have considered only the past datas, the machine learning technique has been widely used to estimate the probability of future events, as it provides the ability to encompass nonlinear and complex effects, contributing to an easy understanding of them, as they come from a process simple, through decision trees, and generate satisfactory results in models of the same context (BARBOZA et al., 2017), so that one can analyze the computational performance in the forecast of TSR by a predictive proxy and as a consequence, obtain the mitigation of decision errors and maximizing return.

Decision making and investments

One of the shareholder's indicator of performance on their investments, is the TSR, and after the modeling proposed in this study, how to make the decision to invest in one company and not in another?

The classical theory of economics assumes that individuals are rational, thus Camerer et al. (2005) explained that the decision-making process takes place in terms of controlled or automatic processes, based on characteristics of the neural circuits between two processing systems: cognitive (reason) and affective (emotion).

Controlled processes can be made an analogy to computational logic, or the resolution of a mathematical problem, so that the decision maker in the face of a need for decision making uses tools or techniques to solve it, mainly reason involving in his judgment, the weight in his decision-making efforts.

As a counterpoint to the controlled decision-making process, there is the automatic process, which

is unconscious, simultaneous and requires much less effort compared to the controlled processes. It is present in a secondary and automatic way in the individual, such as the act of eating or walking while performing another activity.

In another aspect, Thaler (2016) exposed individuals are not as rational as predicted by classical theory, he is more likely to make decisions analyzing the short term in relation to the long term, and has a great influence by the nudge, which he even explains as being a trigger or push that influences the decision of the consumer in general.

Total Return to Shareholders

The TSR is a performance ratio, which combines capital gains and the receipt of dividends, is based on economic facts and not on accounting data. Further, TSR is widely accepted as a metric for investors and required by the Securities and Exchange Commission (SEC), which has compelled disclosure since March 2007 (BURGMAN et al., 2012).

In line with Jeppson et al. (2009), TSR analyzes the appreciation of the share price, comparing the price at the beginning with the price at the end of the fiscal period and dividends paid in that, reflecting the market's perception of the company's performance.

The TSR is used to measure the performance of the shares over a period of time and is calculated by adding dividends per share to the change in the share price and dividing the result by the initial share price (LEV, 2003; 2011). This expression is mathematically given by Eq. (1), as follows:

$$\text{TSR}= \frac{Final\ share\ price - Initial\ share\ price + Dividends\ per\ share}{Initial\ share\ price} \quad (1)$$

In the search for better understanding, we take into account the assumptions based on previous studies of Barney's (1991) proposal, by using the hypotheses of previous studies performed by Heiens et al. (2007) and adjustments in Lev's (2011) hypotheses. In the hypothesis below the $Rfreg$ is variable the predictive proxy as explained in the 2.3 Predictive factors. Hence, the hypotheses can be defined here, followed by their mathematical expressions:

H1. The higher the ratio of the advertisement expenses (ADVER) to revenue (REV), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \frac{\beta_1 ADVER_{it-1}}{\beta_1 REV_{it-1}} + Rfreg + \varepsilon_{it-1} \quad (2)$$

H2. The higher the ratio of goodwill (GW) to total assets (TA), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \frac{\beta_1 GW_{it-1}}{\beta_1 TA_{it-1}} + Rfreg + \varepsilon_{it-1} \quad (3)$$

H3. The higher the ratio of intangible assets (IA) to total assets (TA), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \frac{\beta_1 IA_{it-1}}{\beta_1 TA_{it-1}} + Rfreg + \varepsilon_{it-1} \quad (4)$$

H4. The higher the ratio in research and development (RD) with sales (REV), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \frac{\beta_1 RD_{it-1}}{\beta_1 REV_{it-1}} + Rfreg + \varepsilon_{it-1} \quad (5)$$

H5. The greater the expenditure on research and development (RD), advertising (ADVER), and goodwill (GW), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \beta_1 RD_{it-1} + \beta_1 ADVER_{it-1} + \beta_1 GW_{it-1} + Rfreg + \varepsilon_{it-1} \quad (6)$$

H6. The greater the expenditure on research and development (RD) and advertising (ADVER), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \beta_1 RD_{it-1} + \beta_1 ADVER_{it-1} + Rfreg + \varepsilon_{it-1} \quad (7)$$

H7. The greater the investment in research and development (RD), capital expenditure (CAPEX) and expenses with sales, general and administrative (SGA), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \beta_1 RD_{it-1} + \beta_2 CAPEX_{it-1} + \beta_3 SGA_{it-1} + Rfreg + \varepsilon_{it-1} \quad (8)$$

H8. The greater the gain before interest, taxes, depreciation and amortization (EBITDA), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \beta_1 EBITDA_{it-1} + Rfreg + \varepsilon_{it-1} \quad (9)$$

H9. The greater the Return on Assets (ROA), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \beta_1 ROA_{it-1} + Rfreg + \varepsilon_{it-1} \quad (10)$$

H10. The greater the return on equity (ROE), the greater the total shareholder return (TSR).

$$TSR_{it} = \beta_{oi} + \beta_1 ROE_{it-1} + Rfreg + \varepsilon_{it-1} \quad (11)$$

METHODOLOGY

The present research aims to analyze the determinants factors that impact the TSR in public companies in Europe using the RBV as an underlying theory proposed by Barney (1991). For this purpose, we inspect four hypotheses preciously studied by Heiens et al. (2007), namely H1 to H4. Six new hypotheses (H5 to H10) following Lev's insights (2011) were added for deeper insights.

And in order to improve the assertiveness of results, a predictive proxy for TSR_{t+1} was added to the model (BARBOZA et al., 2017) in a reason to try to forecast future trends.

The database was Capital IQ and the data were obtained from 1999 to 2019 in quarterly bases; econometric panel data tests were performed with the Stata-15 software. After the loss of the freedom degree, due to the delay of 1 period, as well as the missing data in part of the missing database, the final sample of the research is composed total of 65,535 observations, splited per country as shown in table 1.

Table 1: Total Observation by country.

Country	Observations	Country	Observations
Áustria	1.133	Lithuania	112
Belgium	2.049	Luxembourg	125
Denmark	1.786	Monaco	64
Finland	2.101	Netherlands	1.620

France	9.610	Poland	1.351
Germany	9.019	Portugal	825
Greece	332	Spain	2.134
Hungary	364	Sweden	5.056
Ireland	761	Turkey	946
Italy	2.349	United Kingdom	23.798
		Total	**65.535**

Search variables

Table 2 shows the search variables extracted from the Capital IQ database, as well as their respective acronyms, description and code in the database.

Table 2: Research variables.

Acronym	Code (Capital IQ)	Meaning
ADVER	IQ_ADVERTISING	Advertising Expenses
CAPEX	IQ_CAPEX	Capital expenditure
DPS	IQ_TOTAL_DIV_PAID_CF	Dividends per share
EBITDA	IQ_EBITDA	Earnings before interest, taxes, depreciation and amortization
EQ	IQ_TOTAL_EQUITY	Equity
FS	IQ_FINAL_SHARE	Final share price
GW	IQ_GW	Goodwill
IA	IQ_GROSS_INTAN_ASSETS	Intangible Assets
IS	IQ_INITIAL_SHARE	Initial share price
LSP	IQ_LASTSALEPRICE	Market price - Year End
NI	IQ_NI	Net Income
OP	IQ_OPER_INC	Operating Income
RD	IQ_RD_EXP	Research and development
VER	IQ_TOTAL_REV	Net Revenue
SGA	IQ_SGA	Selling, General and administrative
SO	IQ_SHARESOUTSTANDING	Stock number
TA	IQ_TOTAL_ASSETS	Total Assets
TL	IQ_TOTAL_LIAB_EQUITY	Total Liabilities

Operationalization of variables

According to Table 3, some variables in the database were calculated in order to analyze the TSR of companies according to the hypotheses of Heiens et al. (2007) and in the hypotheses of Lev (2011).

Table 3: Operationalization of variables.

Variable	Variable description	Variable calculation
TSR	Total Shareholder Return: represents the financial value created for the shareholder over time	TSR = (Final Share – Initial Share)+ Div) / (Initial Share)
ROA	Return on Assets	ROA = Net Income/ Total Assets
ROE	Return on Equity	ROE = Net Income/ Equity
RADVERREV	Ratio of Advertising and Net Revenue	RADVERREV = Adversiting/ Net Revenue
RGWTA	Ratio of Goodwill and Tangible Assets	RGWTA = Goodwill/ Total Assets
RIATA	Ratio of Intangible Assets and Tangible Assets	RIATA = Intangible Assets/ Total Assets
RRDREV	Ratio of Research and Development and Net Renevue	RRDREV = RD/ Net Revenue
Rfreg	Predicted result from Mc Learning in T+1	Machine Learning

RESULTS AND DISCUSSION

Before examining econometric outcomes, Table 4 presents the descriptive statistics and in Table 5 the data's correlation matrix by hypothesis.

The database presented a unbalanced panel data, with 65,535 observations. To avoid losing a freedom degree, as an assumption of stationary data, the Unit Root Test was not considered.

According to the Table 1, the dataset consists of European public companies, excluding financial

companies, available in Capital IQ database.

In summary, there were 65,535 observations from 1,183 companies. Some instances presented negative TSR values due to the decrease in the share price from one quarter to the next, so the TSR value shows a negative variation. Besides that, we found negative values for Research & Development and CAPEX due to the accounting reversals in accordance with IFRS, as well negative ROA and ROE values due to the negative NI in certain periods.

Table 4: Descriptive statistics.

Hypothesis	Variable	Obs.	Mean	Std. deviation	Min.	Max.	Nº of Companies
1	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	RADVERREV	-0,891932	21,48386	-4,35E+09	1,22E+09		
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	
2	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	RGWTA		8,384262	411,7433	0	59572,53	
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	
3	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	RIATA		4,242343	305,2362	0	46808,76	
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	
4	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	RRDREV		-2,89E+04	3232094	-5,78E+08	0	
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	
5	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	RD		-7,39E+04	797933,7	-5,50E+07	0,00E+00	
	ADVER		-1,73E+04	540936,3	-3,48E+07	0,00E+00	
	GW		1,07E+07	1,41E+08	0	7,63E+09	
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	
6	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	RD		-7,39E+04	797933,7	-5,50E+07	0,00E+00	
	ADVER		-1,73E+04	540936,3	-34800000	0,00E+00	
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	
7	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	RD		-7,39E+04	797933,7	-5,50E+07	0,00E+00	
	CAPEX		-8,89E+05	6554329	-2,15E+08	0,00E+00	
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	
8	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	EBITDA		2,48E+06	1,54E+07	-5,66E+07	7,08E+08	
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	
9	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	ROA		-8,49E+01	2,05E+04	-5,24E+06	1,36E+05	
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	
10	TSR	65535	-4,18E+08	1,34E+09	-9,99E+09	8,71E+09	1183
	ROE		1,33E+02	1,44E+05	-1,31E+07	2,73E+07	
	Rfreg		-6,58E+13	1,50E+14	-9,99E+14	2,53E+14	

Table 5 shows the variables' correlations by hypotheses. In general, low correlations between the variables and the TSR were found and the Table 6 shows the econometric results of the 10 hypotheses.

Table 5: Correlation matrix.

Hypothesis 1	**TSR**	**RADVERREV**	**Rfreg**
RADVERREV	-0,0013	1,0000	
Rfreg	0,4126	-0,0014	1,0000
Hypothesis 2	**TSR**	**RGWTA**	**Rfreg**
RGWTA	0,0079	1,0000	
Rfreg	0,4126	0,0013	1,0000
Hypothesis 3	**TSR**	**RIATA**	**Rfreg**
RIATA	0,0029	1,0000	
Rfreg	0,4126	0,0038	1,0000
Hypothesis 4	**TSR**	**RRDREV**	**Rfreg**
RRDREV	-0,0029	1,0000	

Rfreg	0,4126	-0,0039	1,0000		
Hypothesis 5	**TSR**	**RD**	**ADVER**	**GW**	**Rfreg**
RD	0,0774	1,0000			
ADVER	0,0201	0,0492	1,0000		
GW	-0,1101	-0,0425	-0,0093	1,0000	
Rfreg	0,4126	0,1043	0,0552	-0,1198	1,0000
Hypothesis 6	**TSR**	**RD**	**ADVER**	**Rfreg**	
RD	0,0774	1,0000			
ADVER	0,0201	0,0492	1,0000		
Rfreg	0,4126	0,1043	0,0552	1,0000	
Hypothesis 7	**TSR**	**RD**	**CAPEX**	**SGA**	**Rfreg**
RD	0,0774	1,0000			
CAPEX	0,1818	0,0721	1,0000		
SGA	0,1707	0,1395	0,4858	1,0000	
Rfreg	0,4126	0,1043	0,2206	0,2458	1,0000
Hypothesis 8	**TSR**	**EBITDA**	**Rfreg**		
EBITDA	0,1840	1,0000			
Rfreg	0,4126	0,2566	1,0000		
Hypothesis 9	**TSR**	**ROA**	**Rfreg**		
ROA	-0,0015	1,0000			
Rfreg	0,4126	-0,0019	1,0000		
Hypothesis 10	**TSR**	**ROE**	**Rfreg**		
ROE	-0,0003	1,0000			
Rfreg	0,4126	-0,0007	1,0000		

Table 6: Summary of results, showing each hypothesis (H1 to H10) by columns**.**

Model	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4	Hypothesis 5	Hypothesis 6	Hypothesis 7	Hypothesis 8	Hypothesis 9	Hypothesis 10
Dependent Variable	TSR	TSR	TSR	TSR	TSR	TSR	TSR	TSR	TSR	TSR
Constant	-2,53E+08	-2,53E+08	-2,53E+08	-2,53E+08	-2,53E+08	-2,53E+08	-2,53E+08	2,51E+08	-2,53E+08	-2,53E+08
ADVER	-	-	-	-	29,90269	29,89014	-	-	-	-
CAPEX	-	-	-	-	-	-	9,975426	-	-	-
EBITDA	-	-	-	-	-	-	-	-1,38829	-	-
GW	-	-	-	-	-0,01166315	-	-	-	-	-
RADVERREV	-2,85E+03	-	-	-	-	-	-	-	-	-
RD	-	-	-	-	17,552215	18,18117	16,55672	-	-	
Rfreg	1,72E-06	1,72E-06	1,72E-06	1,72E-06	1,73E-06	1,73E-06	1,72E-06	1,72E-06	1,72E-06	1,73E-06
RGWTA	-	-2,39E+04	-	-	-	-	-	-	-	-
RIATA	-	-	-6,26E+02	-	-	-	-	-	-	-
ROA	-	-	-	-	-	-	-	-	-98,45446	-
ROE	-	-	-	-	-	-	-	-	-	3,361786
RRDREV	-	-	-	0,058	-	-	-	-	-	-
SGA	-	-	-	-	-	-	-1,525474	-	-	-
Chow Test| F Test	18,62*	18,62*	18,62*	18,62*	18,21*	18,52*	17,77*	18,04*	18,61*	18,62*
Breusch-Pagan	1,1e+05*	1,1e+05*	1,1e+05*	1,1e+05*	1,0e+05*	1,0e+05*	98481,52*	99555,65*	1,1e+05*	1,10E+05
Hausman	-0,05*	-0,14*	-0,23*	-,022*	0,00E+00	32,57*	286,28*	214,67*	-0,010	-0,59*
R^2 / Within	0,0153	0,0154	0,0153	0,0153	0,0154	0,0154	0,0159	0,0151	0,0153	0,0153
R^2 / Between	0,5662	0,5664	0,5662	0,5662	0,5682	0,5626	0,5503	0,5715	0,5662	0,5662
R^2/ Overall	0,1703	0,1703	0,1703	0,1703	0,1729	0,1705	0,1679	0,1745	0,1703	0,1703
Heterodedasticity	1,3E+53*	1,3e+53*	1,3E+53*	1,3E+53*	1,3E+53*	1,3E+53*	0,00E+00	1,3E+53*	1,3E+53*	1,3E+44*
Autocorrelation	30,855*	30,821*	30,857*	30,855*	30,793*	30,708*	30,889*	31,009*	30,862*	30,855*
Model Statistics	1771,79*	1778,29*	1772,18*	1771,77*	1822,71*	1797,58*	1893,09*	1793,83*	1772,42*	500,06*
Observations	65535	65535	65535	65535	65535	65535	65535	65535	65535	655535

*Significance at the level of 1% **Significance at the level of 5% ***Significance at the level of 10%.

Results indicated the presence of heteroscedastic data (Hausman tests in a panel model with the fix or random effect and Wald test), and correlation (Wooldridge test). All hypotheses presented a level of significance of 1% and the results suggest that independent variables explain close of 57% of the dependent variable. The results of the first hypothesis suggest that Ratio of Adverting and Revenue has a negative relation with TSR, partially agreeing with the hypothesis that the higher the Ratio of Adverting and Revenue, the greater the TSR, making a reasonable measurement of the TSR.

Regarding to the second hypothesis, the Ratio of Goodwill and Tangible Assets has a positive relation with the TSR, agreeing with the hypothesis that the greater the ratio of Goodwill and Tangible Assets, the greater the TSR, making up a good measure of TSR measurement. The future expectation of gains encourages

the market to positively the shares price, impacting an increase in the TSR.

Similarly to the second hypothesis, the third hypothesis, the Ratio of Intangible Assets and Tangible Assets has a positive relation with TSR in the regression for H3, agreeing with the hypothesis that the higher the ratio of Intangible Assets and Tangible Assets, the greater the TSR, performing a good measurement of TSR. Intangible assets generate added value in the market shares price, thus positively impacting TSR.

Analogous to H1, the results of the fourth hypothesis suggest that the Ratio of Research & Development and Revenue has a negative relation with TSR, partially agreeing with the hypothesis that the greater the ratio of Research & Development and Revenue, the greater the TSR, making up a reasonable TSR measuring. Research and development expenses decrease the company's bottom line, thereby decreasing dividends and TSR.

Analyzing H5, we can see that Adverting and Research & Development have a positive relation with TSR, and GW a negative correlation with TSR, partially agreeing with the hypothesis that the greater the Adverting, Goodwill and Research & Development RD, the greater the TSR, performing a reasonable TSR measure. Advertising, Research & Development expenses increase the company's results becoming the company products and services more attractive to the costumers, consequently increase dividends and TSR; as goodwill assumptions is a difficult matter as market assumptions versus the reality, it was observed that it’s not a good measure to impact the TSR.

Concerning to the sixth hypothesis, our results show that Adverting and Research & Development have a positive relation with TSR, in line with the hypothesis that the greater Adverting and Research & Development, the greater the TSR, performing a reasonable TSR measurement. Through adversitse expenses the company better communicate its products and service to the market consumer; Research & Development brings out contemporaneous necessity consumers, maintaining the portfolio solutions modern, updated, and attractive to the consumers.

In the seventh hypothesis, CAPEX, SGA and Research & Development have a positive relation with TSR, in line with the hypothesis of the greater Research & Development, CAPEX and SGA, the greater the TSR, performing a good TSR measurement. CAPEX investments enable companies to make a strategic difference and to obtain better results, as well as investment in sales and management forces, thus improving the company's results and dividends, thus increasing the TSR.

The eighth hypothesis results suggest that EBITDA has a positive relation with the TSR, agreeing with the hypothesis that the greater EBITDA, the greater the TSR, performing a good TSR measurement. Higher EBITDA generates more dividends, in addition to better pricing of the company's shares by the market, thereby increasing the TSR.

The ninth hypothesis results suggest that the ROA has a negative relation with TSR, in disagreement with the hypothesis that the greater ROA, the greater the TSR, indicating that is not a good indicator to increase the TSR. The tenth hypothesis results suggest that they ROE has a negative relation with the TSR. This result does not sustain the hypothesis that the greater the ROE, the greater the TSR.

Table 7 presents the results of this study according to the assumptions of the Resourced Based View

and the dynamic capability theory. In the light of the Resourced Based View theory, and the respective maintenance of the RBV assumptions by sustaining the competitive advantage corroborated by the dynamic capability theory, the independent variables CAPEX, EBITDA, Goodwill, tangible assets, intangible assets, total assets and SGA are good measures performance and with a positive relation for the measurement of TSR because they are internal resources of the company; the expenses with research and development and advertising, have a negative relation with the TSR, and their expenses because they have a high level of uncertainty, and mainly dependent on factors external to the company, address concepts antagonistic to Resourced Based View and about the dynamic capability theory, which values internal factors for obtaining and maintaining competitive advantage. Table 8 shows a summary of the results of previous studies by hypotheses.

Table 7: Relationship between two independent variables, generation of results and theories.

Independent variables	Area	Relation to TSR	Resource Based View	Dynamic Capacity
ADVER	Marketing	Positive	Heiens, Leach, Magrath (2007) found in previous studies similar results in relation to the return to the shareholder. RBV is attentive to the company's internal resources (Barney, 1991).	Heiens, Leach, Magrath (2007) found in previous studies similar results in relation to the return to the shareholder.
CAPEX	Operational	Positive	Barney (1991) states that the investment in physical resources brings a competitive advantage to the company.	Makadok (2001); Wu (2010); Lin & Wu (2014) start from the resource-based view and from sustaining competitive advantage over time.
EBITDA	Finance	Positive	Performance measure not addressed by RBV, but tested in the proposal of Gu and Lev (2011) that contribute to the return to the shareholder.	Performance measure not addressed by RBV, but tested in the proposal of Gu and Lev (2011) that contribute to the return to the shareholder.
GW	Strategic	Negative	Xiao, Lew and Park (2017) state that intangible assets bring competitive advantage through differentiation with competitors.	Aurier and Teece (2008) start from the assumptions of RBV combined with the innovation capacity of intangible assets for the company's competitive advantage.
IA	Operational	Positive	Barney (1991) states that the investment in the company's internal resources, whether tangible or intangible, brings a competitive advantage to the company.	Makadok (2001); Wu (2010); Lin & Wu (2014) start from the resource-based view and from sustaining competitive advantage over time.
RD	Operational	Positive	Heiens, Leach, Magrath (2007) found in previous studies similar results in relation to the return to the shareholder. RBV is attentive to the company's internal resources (Barney, 1991).	Heiens, Leach, Magrath (2007) found in previous studies similar results in relation to the return to the shareholder.
ROA	Finance	Negative	Performance measure not addressed by RBV, suggested by the authors in order to test other measures that contribute to the return to the shareholder.	Performance measure not addressed by the dynamic capacity, suggested by the authors in order to test other measures that contribute to the return to the shareholder.
ROE	Finance	Negative	Performance measure not addressed by RBV, suggested by the authors in order to test other measures that contribute to the return to the shareholder.	Performance measure not addressed by the dynamic capacity, suggested by the authors in order to test other measures that contribute to the return to the shareholder.
SGA	Administrative	Positive	Peteraf and Barney (2003) state that the company's internal resources provide differentials for the company, results in competitive advantage and return to shareholders.	Makadok (2001); Wu (2010); Lin & Wu (2014) start from the resource-based view and from sustaining competitive advantage over time.
TA	Operational	Positive	Barney (1991) states that the investment in the company's internal resources, whether tangible or intangible, brings a competitive advantage to the company.	Makadok (2001); Wu (2010); Lin & Wu (2014) start from the resource-based view and from sustaining competitive advantage over time.

Table 8: Summary of the results of previous studies by hypothesis.

Author	Country	Sector	Hypothesis 1	Hypothesis 2	Hypothesis 3	Hypothesis 4	Hypothesis 5	Hypothesis 6	Hypothesis 7	Hypothesis 8	Hypothesis 9	Hypothesis 10
Heiens, Leach, Magrath (2007)	United States	Trade manufacturing	Not confirmed	Confirmed	Confirmed	Not confirmed	Not tested	Not tested	Not tested	Not tested	Not tested	Not tested
Basso, F. C.; et al. (2015)	United States	Tecnology	Not tested	Not tested	Not tested	Not tested	Not confirmed	Not confirmed	Not confirmed	Not tested	Not tested	Not tested
Vasconcelos, T.; Forte, D.; Basso, L.F.C (2019)	Germany	All	Not tested	Not tested	Not tested	Not tested	Not confirmed	Confirmed	Confirmed	Not tested	Not tested	Not tested
Vasconcelos, T.; Forte, D.; Basso, L.F.C (2019)	England	All	Not tested	Not tested	Not tested	Not tested	Not confirmed	Not confirmed	Confirmed	Not tested	Not tested	Not tested
Vasconcelos, T.; Forte, D.; Basso, L.F.C (2019)	Europe	All	Not tested	Not tested	Not tested	Not tested	Not confirmed	Not confirmed	Confirmed	Not tested	Not tested	Not tested
Vasconcelos, T; Forte, D. (2020)	Europe	All	Not confirmed	Confirmed	Confirmed	Not confirmed	Confirmed	Confirmed	Confirmed	Confirmed	Not confirmed	Not confirmed

CONCLUSIONS

This study focused on some relevant discussions in the value creation strategy of intangibility. The results are important for management conclusions, both practical and academic, in order to review the current notion of “expenses” elevating them to a strategical role in value creation in the architectural structure of the company.

After all, the investments that shareholders have in the companies, internally reflected in assets and corporate structure, generate the return on capital employed over time through the exposure of a certain risk. Yet, investors seek to maximize their return according to the risk.

The TSR is a traditional indicator and the managers must choose what is the business model in order to maximize the return on the invested capital, considering the resources used by the company and external environment factors.

This study sought to investigate, based on Barney's Resource Based View (1991) and Dynamic Capability states that the use of resources within a company is strategical in creating value, without exhausting the topic, what was the TSR of European companies related to the degree of tangibility. 10 hypotheses were investigated through as an innovative methodological contribution, a machine learning technique was used for generating the TSR trends in the European non-financial companies quarterly base data, from 1999-2019 from the Capital IQ database.

The sample consisted of 1,183 public companies in Europe, excluding financial sector. These companies were analyzed using a regression model with panel data. In order to measure the influences of the external environment, a TSR predictive proxy was used at t + 1. Further, independent variable presented lag of 1 period in relation to the dependent variable.

In all cases, the results indicate that the independent variables are interesting measures to estimate the TSR, and generally the independent variables had about 56% of explanation for the dependent variable; however, there are positive and negative correlations with the TSR, so in order to optimize the future TSR, managers must pay attention to this point of the decision making process.

The results of this research are in line with the Resource-Based View and with the Dynamic Capability Theory. The panel data analysis results bring new insights. The question is not Tangible or Intangible anymore but the nature of Intangibility that is deterministic for the TSR. Therefore, not only Intangible Assets, but Capital Expenses, Administrative Costs, Advertisement, Research and Development and EBITDA were

fundamental to create value to TSR. The results guide the management on how to spend time and money in deterministic to maximize the TSR.

This may be a small contribution in the value creation theory that deserves to be deeper studied. This paper certainly does not claim to exhaust all aspects of the issue, but to be a means and aim at a better understanding. As a suggestion for improvement and future studies using the same variables and hypothesis: (1)to segregate companies by countries, (2) by segments , (3) to use other independent variables to test their influence on the TSR and (4) to insert exogenous factors for the forecast of model.

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