

**Proceedings of the
9th European Conference on
Innovation and
Entrepreneurship
University of Ulster Business School
and
School of Social Enterprises Ireland
Belfast, UK
18-19 September 2014**



Edited by

Brendan Galbraith

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ECIE 2014**

**University of Ulster and School of Social
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Performance and Innovation Insights: Empirical Evidence From Portuguese and Spanish Listed Companies

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Abstract: Knowledge creation inside companies stems from the systematic and dynamic combination of individuals and activities towards the best fit of innovation and performance. It results from the merger of knowledge creation activities and organizational capabilities which determine the firm's potential for innovation and potential returns. Those organizational skills embody the corporate knowledge assets, which include intellectual property and other intangible assets, recognized in the company's balance sheet or immediately expensed. In this dynamic process, marketable innovations are usually generated by human capital, strongly tacit knowledge based, and converted into legally protected intellectual resources. Thus, those resources translate the firm's innovative side and act as business drivers towards its current performance and future sustainability. Fostering the innovation processes inside the organization or within the entire network in which the company is integrated, it is the structure of sustainability and commitment with stakeholders' expectations. The value chains of innovation are responsible for ensuring the quality of products and processes, time based to markets and catalysts of reliable invested capital returns. In a purely logic of sustained value creation, innovation activities and decisions should emerge as key insights to business performance and sustainable return. Based on the companies integrating the stock exchange indexes PSI (Portugal) or IBEX (Spain), and through a regression estimation model, this paper aims to evidence whether and to what extent explanatory variables have a significant impact in the overall performance. We found a suggestive lag time between intangibles capitalization and its impact on turnover. It can suggest that returns deriving from intangibles are deferred according the IAS 38 scope and framework. This can also be a warning signal towards the identification of intangibles' useful lives and their potential impairment recognition.

Keywords: innovation, performance, intangibles, *Portuguese Stock Index*, IBEX

1. Introduction

1.1 Scope

Intangible assets appear, nowadays, as an important issue in the accounting rules frontier – the tension between those responsible for accounting standards establishment and those who use the information, are really critical. Intangibles resources have a value but due to their volatile nature and difficulties in their measurement, they are normally excluded from the financial statements. However, according their linkage and contribution for certain businesses, it is irrefutable their importance for stakeholders. Traditional financial reports, based on traditional accounting rules that exclude the potential return, seem to be irrelevant for decision making. Thus, intangibles identification and measurement approaches can contribute for a better decision making.

Innovation cycle or the innovation value chain claims for a deep analysis on the intangibles identification, measurement and reporting. Radical changes have been occurred in the last two decades of the twentieth century. New business models have also emerged in which knowledge creation, capture, re(use) and diffusion constitute the way ahead to value creation. Companies need to identify the drivers that best contribute for a higher value level and intensity. Invest in intangibles is probably the first step to innovation and consequently for wealth creation. Intellectual capital management and reporting can, in a feasible basis, support the gap of perception between accounting and market value.

1.2 Aims and objectives

Intangibles expenditures, according the main international accounting standards, must be capitalized and recognized as intangibles assets in the companies' financial statements if control exists by the owner, if it is identifiable and if expected future returns are expected. Thus, it is expected that the accounting treatment of intangible expenditures affect the companies' future returns, in particular their performance indicators. This paper aims to evidence whether intangible assets recognition affects, or not, the forthcoming companies' performance indicators, namely their turnover, their return on assets, and their return on equity ratios. According international accounting standards, intangibles can generate future returns within an expected

useful life period. Complementarily, it is intended to identify the gap of time between intangibles capitalization and its effective financial return.

2. Innovation as a source of predictive value

2.1 Intangibles as source of future returns

It has been widely assumed that intangibles resources, most of them not included in the traditional financial statements, act as key drivers in the strategic and financial positioning of a company. Social sciences deal with these resources as knowledge resources (Nonaka and Takeuchi, 2009; Millar and Choi, 2010; Tsai *et al.*, 2013), intellectual capital (Edvinsson *et al.* 1997; Chang and Hsieh, 2011), or as intangible assets (Lev, 2001; Lopes and Rodrigues, 2007; Iltner, 2008; Tanfous, 2013). Dependent from accounting rules and measures, authors like Brockington (1996), Lev (2001), Andriessen (2004) and Cohen (2005) argue about their impact on businesses and on company's value creation. Thus, intangibles have been historically treated as an aggregated amount (goodwill), which represents, in nature, a residual, incorporating all intangibles that cannot be identified nor separately measured. However, this residual can be an important source of potential future returns (Zhang, 2013).

According to Blair and Wallman (2003:451) "*intangibles are non-physical factors that contribute to, or are used in, the production of goods or the provision of services or that are expected to generate future productive benefits to the individuals or firms that control their use*". Lev (2001:5) defines those resources as "*a claim to future benefits that does not have a physical or financial (a stock or a bond) embodiment*". From a pure accounting perspective, and as stated in International Accounting Standard 38 (IFRF, 2014), an intangible is a "*nonfinancial assets without physical substance that are held for use in the production or supply of goods or services or for rental to others, or for administrative purposes, which are identifiable and are controlled by the enterprise as a result of past events, and from which future benefits are expected to flow*". A patent, a brand, and a unique organizational structure (for example an Internet based supply chain) that generate cost savings are intangible assets. Broadly, a typical intangible asset cannot be bought or sold in an organized market, the verification of its existence may be impossible, it may not have a finite life, its value can fluctuate (which means that it should be submitted to the impairment analysis) and sometimes it is strongly interlinked with a specific activity, product/service or business. Hence, intangible assets are commonly development expenditures, patents and trademarks, brand names, databases, human know-how, strategic alliances and processes. Despite that, individuals and companies have an expected future return and benefits based on the intangibles management. Nevertheless, accounting systems defined by FASB has a very conservative nature. Expenditures in research and development, advertising and other similar ones, should be immediately expensed even though they traduce expected future returns. However, according Lev and Sougiannis (2003), Wang (2011), Serrano-Bedia (2012), and Besharati *et al.* (2012), firms' innovation capital (e.g. R&D expenditures) is associated with subsequent returns.

It is, nowadays, irrefutable that intangibles identification, management, measurement (income, cost or market based) and reporting is a key burner on the value creation process. Intangible assets measures and risks such as research and development capitalization, organizational innovation processes and intellectual capital approaches, acting as key drivers in the value creation process. Knowledge arises as the main way to the wisdom achievement and wealth creation. Although intangibles have non-physical nature that contributes to the production of goods and services, companies expect for their future benefits and returns. Individuals and companies responsible to manage them look for the market and adjust their business processes through customization approaches. Broadly, strategies followed by companies such as alliances, mergers and acquisitions, internal and external diversification or disinvestments, even driven by integrated and innovative market approaches, are based on intangibles, in particular research and developments programs. Thus, knowledge based assets are responsible for the major business changes occurred in those decades.

From the perspective of Daum (2003), an intangible asset is anything that has no physical existence or is investment but has value to the organization. They are typically long-term assets that cannot be measured accurately unless the time that the organization is traded (fully or partially) the majority of them are referenced under the name of goodwill (IFRF, 2014). These assets have no physical substance, possess a high degree of uncertainty in relation to future benefits achievements, only have value for a given entity, sometimes its economic duration is unknown, and they are usually subject to wide fluctuations in value

because those benefits are also associated to competitive advantages. Broadly, intangibles are also associated to identifiability, to the existence of expected economic benefits within their useful lives.

Authors as Relly and Schweihs (1999) underline a broader view of intangible assets, criticizing the pure legal, accounting and taxation approaches. Thus, from the perspective of its economic and financial measurement, an intangible asset should have a set of features or descriptors indispensable to its classification as such. These resources should be capitalized and included in the companies' financial statements if comply with a set of characteristics, such as:

- Must be subject to specific identification and a recognized descriptor to guarantee their unique property ;
- Possess existence and legal protection;
- Associated with the legal right to private property, and the same must be legally transferable and can therefore be legally claimed;
- A tangible manifestation or evidence of its existence is required;
- Its existence should be manifested in a certain identifiable point or result from a particular phenomenon or event;
- Those assets must have associated the possibility of being destroyed or terminated in a particular time or as a result of a phenomenon or identifiable event.

On the concept of intangible asset, Brockington (1996) already has incorporated some of the ideas previously expressed by stating that the value is created and maintained in most cases by expectations about the future and about the impact that those elements have in the organization's positioning. Thus, this expectation management consolidates the existence of intangible assets as a whole. Ignore them or treat them in an idiosyncratic way would undermine the basis of a true and fair view of the financial reporting basis of the accounting systems. Broadly, it is an asset without physical substance or monetary nature, however complies with the following descriptors:

- Cannot generally be bought or sold on an organized market. Its realization will depend on the continued operation of the business or organizational ability to find a qualified buyer;
- Assumes specific to its proprietary nature, sometimes not having any value for others except for those who actually owns it;
- The availability of the asset or assumes affects business continuity or substantial part of the activities of the organization;
- The direct verification of its existence may prove impossible. Thus, there may be a mere manifestation that will translate into advantages even for one who is not her real owner;
- It can have a finite economic life but in no case shall be subject to abrupt disappearance;
- Its value may fluctuate unpredictably over time.

The boundary between tangible and intangible assets is clearly not always enlightening. Hence, we assume in this paper the definition stated out in the IAS 38 (IFRF, 2014), expressing that an intangible asset is a nonfinancial asset without physical substance, held for use, supply or rental, or even for administrative purposes, which comply with some financial and economic assumptions: it is identifiable, it is controlled by its owner, it can be measured on a feasible basis, and it incorporates expected future benefits and returns. Otherwise, those expenditures should be expensed in the period when they have occurred, affecting negatively the current period income. Thus, expenditures in resources or liabilities that the company has incurred as a result of the acquisition, development, maintenance or enhancement of intangible resources, such as scientific or technical knowledge, design and implementation of new processes or systems, licenses, intellectual property internally developed, market knowledge, and trademarks, should be recognized in the financial statements as expenses in the period, as illustrated in the figure 1.

According IFRS's standard (IFRF, 2014), internally generated intangible assets should be classified in two phases: the research phase and a further advanced development phase. Expenditures occurred in the first phase should be expensed in the period because the organization cannot demonstrate whether an intangible exists and that will generate probable net cash inflows. The same procedure applies for other items such as internally generated brands, internally generated goodwill (IFRF, 2014), and other similar items. However, in

this scope, we consider that those expenditures, although affecting the period net income, can positively affect the organization's turnover. Expenditures occurred during the development phase can be capitalized, having a deferred impact on future performance indicators (Wang, 2011; Besharati *et al.*, 2012; Kommenic *et al.*, 2013; Al-Matari *et al.*, 2014). Those expenditures are associated to the production of new or substantially improved material, devices, products, processes, systems, or services, prior the commencement of commercial production or use. In both cases, organization's performance embodies influxes, arising from capitalized or expensed expenditures.

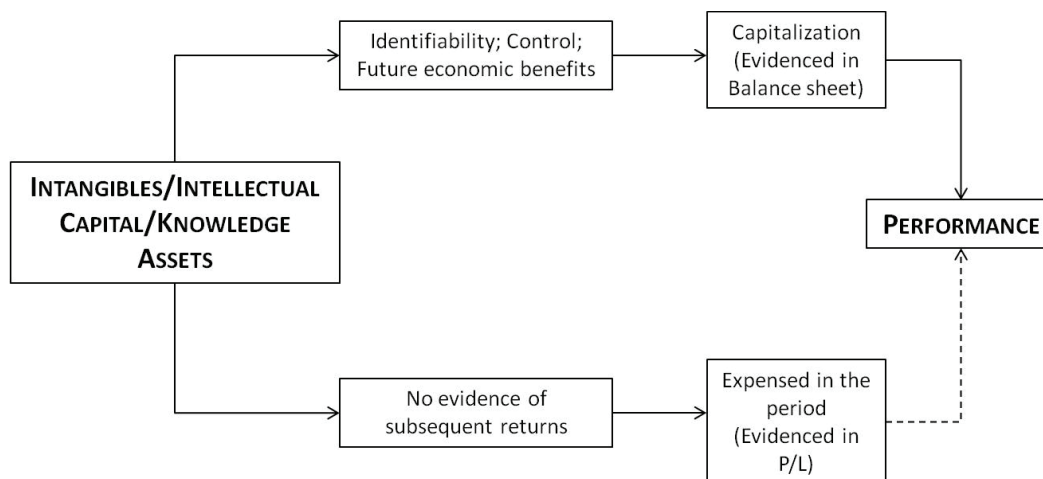


Figure 1: Intangible resources expenditures

2.2 Innovation as a performance driver

Innovation, *latu sensu*, is not only related to products and processes. The new combinations enunciated by Shumpeter (1952) allow us to conclude that innovation may be observed from the waves of creative destruction, able to restructure the entire market. The *OSLO Manual* (OECD, 2005) defines innovation as "(...) the implementation of a new or significantly improved product (good or service), or process, a new marketing method, or a new organizational method in business practices, workplace organization or external relations". It introduces four different types of innovation, namely product innovation, process innovation, marketing innovation, and organizational innovation.

- *Product innovation* relates to the Introduction of new goods or services or significant increases in their functional characteristics (technical specifications, components and materials, incorporated software, user friendliness or other functional characteristics) regarding the intended use of existing goods and services improvements;
- *Process innovation* is the implementation of a new or significantly improved method of production or delivery. It includes significant changes in techniques, equipment and/or software. This type of innovation is based in efficiency and intended to increase product quality, define new production methods or new kinds of delivery relating with new product or with significant improvements;
- *Marketing innovation* relates to the implementation of new marketing method able to promote significant changes in product design or packaging, product placement, product promotion or pricing;
- *Organizational innovations* are based on the implementation of new methods in order to organize routines and new procedures for the guidance of work. This type of innovation proposes the implementation of new organizational methods from the introduction of new business practices, workplace organization, external relationship of the companies, since they have not been used previously and which result from strategic decisions.

As mentioned in the previous section, intangibles capitalized and reported in the organizations' balance sheets are associated with expected future returns, affecting the companies' performance indicators such as turnover, return on equity or return on assets. Hence, we assume that intangible assets can act as a proxy of organization's innovation, affecting positively their performance indicators (Chen *et al.*, 2005; Ittner, 2008; Clarke *et al.*, 2011; Chang and Hsieh, 2011; Besharati *et al.*, 2012; Serrano-Bedia *et al.*, 2012; Tanfous, 2013; Al-Matari *et al.*, 2014) and have a deferred effect on performance (Wang, 2011; Besharati *et al.*, 2012). According Tanfous (2013), the relation between intangible expenses and market capitalization is non-linear while the

integration of different immaterial assets contributes more effectively to value creation. Indeed, Serrano-Bedia *et al.* (2012) has also evidenced that the use of external cooperative innovation has a significant effect on companies' innovation performance indicators. Concerning the effectiveness of R&D intensity, and at a macroeconomic level, Lopes (2011) did not achieve a significant correlation between those expenditures and turnover from innovation. This result is consistent with similar evidences previously achieved by Chan *et al.* (2003) and later on by Chang and Hsieh (2011), relating to companies' operating, financial and market performance. Thus, evidences do not support a direct link between R&D expenditure (and even with other intangibles such as patents, licences, software, etc.) and future returns. Opposite evidences were obtained by Lev and Sougiannis (1996) relating insider gains. These gains in R&D intensive companies are significantly higher than insider gains obtained in firms not strongly engaged in innovation expenditures.

3. Methodology

3.1 Data source

This research is based on 73 non-finance companies, 43 (58,9%) listed in the Portuguese exchange regulated market and 30 (41,1%) in the Spanish one, all of them with reference to fiscal years 2008-2012. Some data was collected from the *DataStream* database and complimentary information was collected through a content analysis (Abraham and Cox, 2007; Sekaran and Bougie, 2013), based on companies' annual consolidated accounts. Those companies are integrated in the Portuguese stock index (PSI) or in the Spanish indexes IBEXTOP and/or IBEX35.

3.2 Variables

Economic and financial performance can be measured through multiple indicators such as turnover, return on equity, return on assets, and earnings before or after interests, taxes, depreciation and amortization (EBITDA/EBIT). All of them are traditional accounting performance measures of operational and financial performance. All of them are commonly used as key performance indicators of profitability of companies and included in their annual reports. Thus, it has been widely used as a measure of financial performance in earlier research (Chen *et al.*, 2005; Gan and Saleh, 2008; Chang and Hsieh, 2011; Clarke *et al.*, 2011; Wang, 2011; Besharati *et al.*, 2012; Tanfous, 2013) as indicators of integrated returns. Intangible assets rates and corresponding predicted economic signals are supported by IFRF (2014). Intangible assets rate is defined as the quotient between the addition/reduction of intangible assets during the period N, divided by total assets. Other independent variables, in particular company size, and sector, are widely supported by literature, namely in Lev and Sougiannis (2003), Nguyen *et al.* (2004), Díaz *et al.* (2005), Ozgulbas *et al.* (2006), Serrano-Bedia (2012), Al-Matari *et al.* (2014), and Crema and Nosella (2014). These references also support their predicted economic signals as evidenced in table 1. Ordinary Least Squares (OLS) multiple regressions were used to test the relationships between those dependent and independent variables. Outliers were removed from the analysis.

Table 1: Variables description and framework

Variable Typology	Var.	Description	predicted Economic Signal
Dependent	TURN	Natural logarithm of total turnover (Y_N)	
	ROA	Return on assets (Y_N)	
	ROE	Return on equity (Y_N)	
Independent	INT1	Intangible assets rate Y_N	+
	INT2	Intangible assets rate $Y_{(N-1)}$	+
	INT3	Intangible assets rate $Y_{(N-2)}$	+
	INT4	Intangible assets rate $Y_{(N-3)}$	+
	INT5	Intangible assets rate $Y_{(N-4)}$	+
	DIM	Natural logarithm of total assets (Y_N)	+
	IND	Exchange stock index (Y_N)	
	SEC	Activity sector	

Companies were aggregated in seven activity sectors (SEC) as follows: 1. Consumer services and transportation; 2. Equipments and industry; 3. Construction and infrastructures; 4. Technologies and communications; 5. Consumer materials; 6. Petrol and energy; and 7. Media and advertising.

3.3 Association measures

Association measures have the objective to quantify the strength and direction between two variables towards the diagnosis of potential causal links. Pearson's correlation (PC) coefficient measures the strength and direction of the linear association between two quantitative variables while the Spearman coefficient measures the strength and direction of that association, albeit non-parametric, between two variables at least classified as nominal. In our analysis we will run the Person's coefficient because it is the one that best fits the main variables introduced in the theoretical model. Cramer's V coefficient is also a non-parametric and asymmetric coefficient, used as an association measure between two nominal variables which will be used, whenever appropriate, only as corroborative validation purposes.

3.4 The regression model

In order to identify which variables ($X_i; i=1, \dots, k$) best contribute to explain the variance of dependent variable, the model stated below has been regressed for the performance indicators. The equation stated below illustrates the path used for key performance indicators used in this research.

$$\hat{TURN} = \beta_0 + \beta_1 INT1_{1j} + \beta_2 INT2_{2j} + \beta_3 INT3_{3j} + \beta_4 INT4_{4j} + \beta_5 INT5_{5j} + \beta_6 DIM_{6j} + \beta_7 IND_{7j} + \beta_8 SEC_{8j} + \varepsilon \quad (1)$$

$(j = 1, \dots, n)$

Thus, all variables were simultaneously introduced in the model in order to identify which ones can predict (rejection of $H_0: \beta_1 = \beta_2 = \dots = \beta_8 = 0; p < \alpha$) the companies' performance and the deferred horizon between intangibles capitalization and effective return, as predicted in the IAS 38 and IFRS 3.

4. Results and discussion

4.1 Descriptive measures

As stated in Figure 2, all companies were aggregated in seven activity sectors. Construction and infrastructures represent 23,3% of total companies, 8 (47,1%) of them integrating the Portuguese Stock Index and 9 (52,9%) negotiated in the IBEX indexes. Media and advertising sector is represented by four companies, three included in PSI and one included in IBEX.

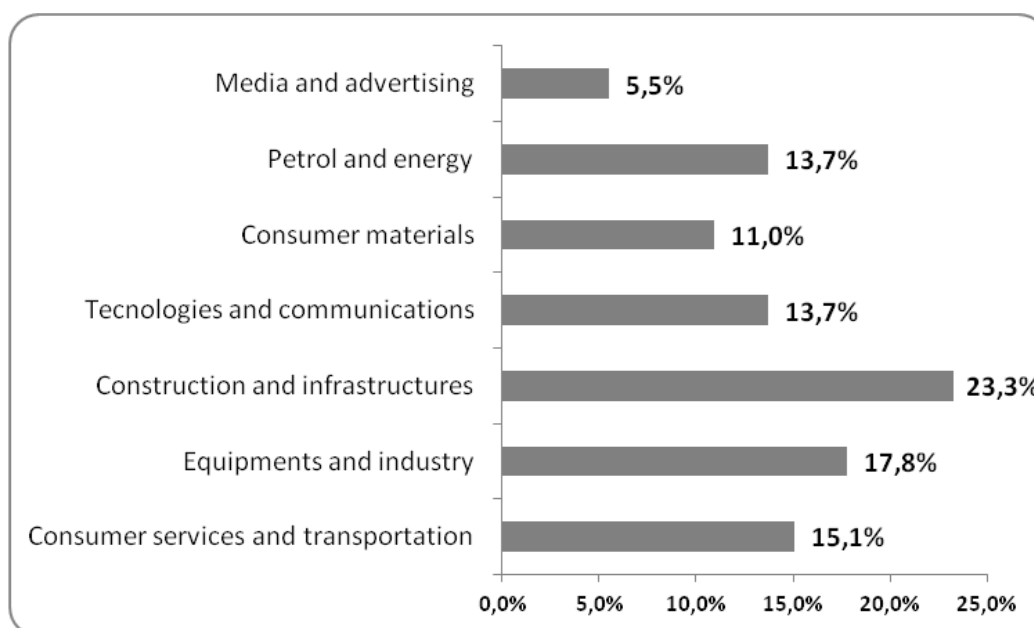


Figure 2: Activity sectors (2008-2012)

In the following table we evidence the main descriptive measures, including Skewness and Kurtosis.

Table 2: Descriptive measures

Variable	Minimum	Maximum	Mean	Std. Deviation	Skewness	Kurtosis
TURN	6,22193	10,79488	8,94565	0,94581	-0,301	0,016
ROE	-190,87	99,14	-0,1326	35,67308	-2,334	11,551
ROA	-78,16	18,36	0,2541	11,10379	-5,068	34,959
INT1	-12,83	74,58	3,7467	5,3421	-2,334	11,551
INT2	-17,16	61,18	2,9238	10,07648	3,596	17,252
INT3	-20,13	13,73	-0,6566	4,16411	-1,097	8,948
INT4	-48,76	37,31	1,0411	9,63422	-1,281	12,733
INT5	-6,77	16,11	0,1358	3,31471	2,146	9,361
DIM	7,14328	11,11318	9,11771	0,90295	0,137	-0,583

Relating association measures, we didn't find a wide range of statistically significant results, except between dependent variable (TURN) and company size (PC=0,678; p=0,000), intangibles rate in 2010 (PC=0,234; p=0,046), intangible rate in 2011 (PC=0,219; p=0,063), and stock index (PC=0,483; p=0,000). Broadly, the intangible assets rates fit the predicted economic signals (IFRF, 2014), except for the year 2012 (INT5). Intangibles capitalization seems to impact positively on turnover, not in the current period but deferred in time (Wang, 2011; Besharati *et al.*, 2012). This evidence can suggest a lag time (up to two or three years) between capitalization and expected returns, corroborating the recognition criteria stated in the international accounting standards. According IAS 38, future economic benefits relates to net cash inflows and may include increased revenues and/or cost savings. Thus, there is a degree of overlap between the asset definition criteria and recognition criteria. Those future economic benefits must be expected in the former and probable in the latter. Surprisingly, we achieved a negative signal between intangibles rate observed in 2012 and turnover level in the same period, albeit not statistically significant ($\chi^2=5183,00$; df=5112; p=0,240). This evidence can eventually be associated to the lag time between intangibles recognition and their effective returns. This evidence requires however further research, namely concerning the typology of intangibles recognized in the companies' balance sheets.

The variable size (DIM) has a positive and significant correlation with turnover, with a Person's correlation of 0,678 (p=000), which corroborates the evidences achieved by Lev and Sougiannis (2003), Nguyen *et al.* (2004), Díaz *et al.* (2005), Ozgulbas *et al.* (2006), and Serrano-Bedia (2012). We didn't find any significant correlation between intangibles rates and ROE or ROA. As argued by Al-Matari *et al.* (2014:38): "The accounting-based measure can reflect the past performance of the company while the market-based indicators help to anticipate the future performance". It can be associated with their integrative nature, as evidenced by Zhang (2013): results indicate that there are significant differences between firms with positive and negative goodwill and its impact on liquidity, profitability, and leverage ratios. Thus, in our model we assume Turnover (TURN) observed in the year 2012, as the dependent performance indicator (dependent variable).

Table 3: Regression models summary

	TURNOVER			
	β (Unst)	β (Std)	t	Sig.
(Constant)	2,795		2,929	0,005*
INT1	0,005	0,106	0,515	0,608
INT2	0,009	0,207	0,332	0,741
INT3	0,024	0,550	4,931	0,023**
INT4	0,029	0,709	2,817	0,057***
INT5	-0,021	-0,518	-0,799	0,427
DIM	0,628	0,600	5,079	0,000*
IND	0,197	0,103	0,845	0,401
SEC	0,050	0,096	0,981	0,330
		R ² =0,490 F=7,698		

		Sig. 0,000*	
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*<0,01 **<0,05 ***<0,1

The regression model is statistically significant for a 1% significance level ($R^2=0,490$; $F=7,698$; $\text{Sig}.0,000$). Although several variables are not statistically significant, the regression equation is evidenced towards an integrated predictive outlook. The variable INT3 (intangibles rate for 2010) is statistically significant ($t=4,931$; $p=0,023$) which corroborates the deferral between intangibles recognition and effective impact in operational returns (Wang, 2011; Besharati *et al.*, 2012). This can also suggest a basis for the intangibles' period of life during which they should be amortized or expensed.

$$\hat{TURN} = 2,795 + 0,005INT1 + 0,009INT2 + 0,024INT3 + 0,029INT4 - 0,021INT5 + 0,628DIM + 0,197IND + 0,05SEC$$

As mentioned in the literature review (IFRF, 2014), intangible assets should be recognized if the relevant recognition criteria are fully observed. These assets are initially measured at cost, subsequently measured at cost or using the revaluation model, and amortised on a systematic basis over their useful lives, unless the asset has an indefinite useful life. Linking the period of time in which those assets were recognized and their impact in turnover could be a basis for the impairments identification and recognition.

5. Lessons learned and directions

Capitalizing intangibles is dependent from the recognition criteria stated in accounting standards, namely intangibles owner's control, their identifiability, their feasible measurement, and their expected future returns within a certain useful life (except if an indefinite useful lives were fixed). Furthermore, from a pure economic approach, those resources should positively impact in the companies' operational and financial performance indicators, such as turnover, ROA, ROE, or others suggested by Al-Matari *et al.* (2014) and Kommenic *et al.* (2013).

Based on listed companies in the Portuguese and Spanish stock regulated markets, we signalized a minimum of two years lag time between the intangibles capitalization and its impact on turnover. This evidence can be a signal that returns deriving from intangibles are effectively deferred as suggested by IAS 38 content. This can be a principal towards the identification of their useful lives and potential impairments recognition. No significant correlation was obtained between intangibles rates and ROA or ROE. As performance indicators of integrated returns, certainly those indicators are driven by other variables, more intensive than intangible assets, in particular different types of innovation (OECD, 2005). In volatile markets, finite useful lives tend to be shorter than the effective useful lives used in traditional sectors or economies. Economically, the fair value fluctuations tend to be higher in intensive knowledge based economies.

As further research, the search for impacts between intangibles rates and performance indicators should be computed for a large range of time, in order to evaluate the trend in the intensity of future returns. Thus, acting the year as a control variable, some economic effects could be observed and economically interpreted. Additionally, new proxy for intangible rates and performance could be computed towards the best fitness between intangible assets and performance (Al-Matari *et al.*, 2014). Furthermore, specific detractors and enablers associated to intangibles returns (Crema and Nosella, 2014) can also be found if the analysis could be carried out at a sector level.

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