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THE RELATIONSHIP BETWEEN INVESTMENT IN INNOVATION AND FINANCIAL SUSTAINABILITY: AN EMPIRICAL STUDY OF COMPANIES IN THE IBERIAN PENINSULA

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Abstract: Sustainability, as defined by the United Nations' 17 Sustainable Development Goals (SDGs), necessitates responsible corporate practices that enhance long-term value and attract investors seeking sustainable performance. This study examines the causal relationship between investment in innovation and financial sustainability, an area where prior research remains inconclusive. The sample consists of 51 companies listed on the PSI (Portugal) and IBEX-35 (Spain) indices between 2011 and 2022. To analyse this relationship, the study employs multiple linear regression models with panel data, ensuring robust statistical inference. The Hausman test determined that a fixed-effects least squares approach was the most appropriate estimation method. Key findings indicate that financial sustainability positively influences innovation investment when lagged by one and two periods, but not in the current period. This suggests that investors and financiers require time to evaluate financial stability before allocating funds to innovation. Conversely, investment in innovation significantly impacts financial sustainability but in a dynamic and time-dependent manner. In the current and previous periods, the effect is negative, indicating that initial innovation expenditures might strain financial resources. However, two periods later, the impact becomes positive, reflecting the long-term benefits of innovation on financial health. Macroeconomic factors also play a role. Gross Domestic Product (GDP) significantly affects both financial sustainability and innovation investment, emphasizing the broader economic context in corporate decision-making. However, company size does not show a significant impact, suggesting that the innovation-finance relationship is not necessarily dependent on firm scale. Profitability indicators, such as return on assets (ROA) and return on equity (ROE), positively influence financial sustainability. However, they do not appear to drive investment in innovation, implying that firms do not directly reinvest profits into R&D. These findings offer important implications for managers, investors, and policymakers, advocating for strategies that balance financial sustainability with innovation investment. Aligning corporate policies with the UN SDGs can promote sustainable development, ensuring long-term economic resilience and environmental responsibility.

Keywords: investment in innovation, sustainable investment, financial sustainability, return on assets, return on equity

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INTRODUCTION

Currently, the issue of sustainability has become a central concern, both for society and companies. The creation by the United Nations (UN) of the 17 Sustainable Development Goals (SDGs) represents a historic milestone in the search for a fairer, more equitable and sustainable global future. These objectives act as a guide to face global challenges, such as climate change, social inequalities and sustainable management of natural resources. At the same time, companies face increasing pressure to adopt responsible practices that minimize negative impacts on the environment and society, but also add value to financial results. The relationship between sustainable investment and/or innovation and business results is, therefore, an area of research with increasing relevance. A sustainable investment can have different dimensions: (1) environmental, with the objective of protecting and preserving the environment, such as excluding operational activities

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harmful to the environment, adopting sustainable practices with the use of renewable energy and production processes with energy efficiency and other resources; (2) social, which evaluates the company's effect on the environment, such as respect for human and workers' rights, promoting health, safety, diversity and inclusion and (3) cooperative, which aims to evaluate the quality of management, particularly in terms of standards ethical, to ensure corporate responsibility (UN, 2015).

Investors and financiers also play a key role in opting for companies that incorporate sustainable practices (Xu & Chen, 2020). Firstly, because they are contributing to social and environmental well-being, contributing to a more sustainable society. Second, studies indicate that companies with sustainability concerns present less volatility in the face of economic risks, hence these companies tend to outperform others in terms of financial performance and present more stable returns in the long term (Eccles et al., 2014). Investors, especially institutional ones, when considering the sustainability of companies in their investment decisions, inducing companies to behave in the same way (Eccles et al., 2014). According to a study by the CFA Institute Centre for Financial Market Integrity (2017), almost ¾ of portfolio managers and financial analysts consider companies' corporate performance in investment decisions. It should also be mentioned that managers are currently witnessing a growing awareness of company sustainability as legislation emerges on the subject and regulators require companies to disclose their sustainability practices (Eccles & Serafeim, 2013). Given the current trend, sustainable investing and sustainable finance are closely related. There is growing evidence that environmental, social and cooperative considerations must be in line with financial objectives, but must also improve financial performance and reduce long-term risks (Eccles & Serafeim, 2013; Eccles et al., 2014; Kölbel et al., 2020). This perspective has been analysed in academic literature. Recently, studies have emerged that find that investment in innovation improves sustainability, productivity and company results and, consequently, financial sustainability (Plank & Doblinger, 2018; Xu et al., 2020).

Given the above, this study aims to analyse the bidirectional relationship between investment in innovation and financial sustainability. The mutual influence of the two variables is analysed. Additionally, it is analysed whether other variables have explanatory capacity for investment in innovation and financial sustainability. To pursue this objective, two models with panel data are estimated using a sample of companies listed in the two markets of the Iberian Peninsula.

The investment decision is reflected in the company's profitability (Lv et al., 2021). The funds required for investment are high and are not recovered in the short term, so investment decisions must be well thought out to avoid causing insolvency/bankruptcy (Rosa & Mukhibad, 2022). There are also other factors that explain the relevance of this study and that differentiate it from existing studies. First, the sample analysed, composed of companies listed in the two regulatory markets of the Iberian Peninsula. There is a lack of studies focused on the companies under analysis, which are practically non-existent. The companies analysed are inserted in a society in which cooperative social responsibility, as well as the 17 UN SDGs, are not yet very rooted. In comparison, companies from other countries/studies, whose awareness among managers, investors and financiers is widespread. Second, understanding the relationship between investment in innovation and sustainable finance is essential for different groups such as managers, investors, researchers and public policy makers. The government can benefit from the results of this study by helping to formulate policies that promote sustainable growth in line with the 17 UN SDGs. For investors and academics, it helps make more informed decisions about resource allocation, identifying investment opportunities and contributing to sustainable development.

This analysis also reinforces the importance of thoughtful investment decisions, given that investments in innovation often involve high initial costs and long-term returns. These decisions must be carefully planned to avoid risks of insolvency or bankruptcy (Lv et al., 2021; Rosa & Mukhibad, 2022). Finally, understanding the interrelationship of investment in innovation and financial sustainability is crucial to promoting business practices that benefit not only companies, but society as a whole, contributing to more balanced and sustainable global development. The article is organized as follows. In this section, the topic, relevance and objectives of the research are introduced. Section 2 presents the literature review. Subsequently, in sections 3 and 4, the methodology and sample used are presented, respectively. Section 5 presents and analyses the empirical results and the discussion and conclusions are presented in section 6.

LITERATURE REVIEW

Over time, several authors have contributed significantly to the development of the concept of corporate social responsibility (CSR). Bowen (1953), considered the father of CSR, argues that companies and/or managers, in addition to economic responsibilities, must also have social responsibilities. However, it was in the 70s that the concept developed the most. Davis (1973) argues that responsibility begins where the law ends. The company is not socially responsible if it only complies with the minimum requirements of the law because that is what any good citizen would do. The author expands the concept of corporate responsibility beyond economic, contractual or legal obligations. Social responsibility must be proportional to corporate power, that is, the greater the power of a company, the greater its social responsibility.

Later, Carroll (1979) was a pioneer in proposing a more structured approach to CSR, which culminated in his famous four-dimensional model: economic responsibility, legal responsibility, ethical responsibility and philanthropic responsibility. This model evolved in the 90s, when Carroll (1991) developed it in four dimensions through a pyramid, hierarchizing the four dimensions in the pyramid. At the base of the pyramid is economic responsibility as the basis for the development of other responsibilities. At the top of the pyramid is philanthropic responsibility. In the 1980s, Freeman (1984) introduced the stakeholder model. For the author, the company must create value for all groups, internal and external stakeholders, and not just for shareholders. In the same line of thought, Elkington (1998) argues that companies must have social responsibilities not only towards their owners, but also towards their stakeholders, such as employees, customers, communities and the environment in which they operate. At the end of the 90s, Carroll (1999) presents the historical evolution, from 1950 to 1990, of the concept of CSR, highlighting its importance in business activity.

These authors, as well as others, notably more recent ones, contributed to the evolution of the CSR concept, which went from a purely economic vision to an integrated approach, considering the responsibilities of companies in relation to their stakeholders and society as a whole. Currently, there is a growing awareness in society that has driven a movement towards corporate sustainability. Investing sustainably, integrating environmental, social and cooperative (CSR) considerations into financial decisions is an increasingly important practice in the world of finance (Xu et al., 2020).

The relationship between innovation/sustainable investment and sustainable finance is complex and multifaceted and has been the subject of study and analysis by several authors. The objective is for companies to seek to balance not only economic interests, but also the social, environmental and cooperative impacts of their operational activity.

There are several studies on the relationship between investment in innovation and financial sustainability, however there is still no consensus on the relationship between these variables (Xu et al., 2020). While some studies suggest a positive association between the two variables (Khan et al., 2015; Xu et al., 2019; Plank & Doblinger, 2018; Saunila & Ukko, 2014), others find mixed or even negative results (García-Sánchez & García-Meca, 2018). Liang et al. (2002) find that companies that are growing and invest in innovation present increasing results with long-term effects. Investment in innovation, particularly in small and medium-sized companies, has positive effects on financial sustainability. Investment in innovation is related to productivity and allows companies to obtain better performance and higher returns compared to companies that do not make this investment (Hall & Mairesse, 1995; Wang et al., 2015; Lassala et al., 2017).

However, the impact of investment in innovation may vary from company to company, depending on a series of factors, such as the sector in which it operates, the innovation strategy adopted and the legislative environment in which the company operates (Bowen et al., 2010; Zhu & Zhao, 2022; Lin et al., 2019). In view of the above, although there is evidence of a generally positive association between investment in innovation and financial sustainability, this relationship may be more complex as it depends on several factors. Currently, investors are not only looking to maximize their investment but also want to contribute to a better world, they prefer investments that comply with ethical values and sustainable investments (Linnenluecke & Daugoard, 2023). This change in investor preference is transforming the financial landscape, influencing policies and practices in companies, financial analysts and financiers, contributing to responsible investment practices (Flammer, 2015; Uzsoki, 2020). When managers decide to invest, they will have to analyse the risks and opportunities inherent to the investment, to highlight the analysis of non-financial risks, related to reputation and environmental regulation (Margolis & Walsh, 2003; Tseng et al, 2019).

Company size is a potentially explanatory variable for both financial sustainability and investment decisions, especially in projects related to innovation. Larger companies generally have more resources and easier access to external capital, whether debt or own, allowing them to finance investments more efficiently (Grilli & Murtinu, 2014).

In contrast, as company size has decreased, additional challenges arise that make the decision-making process more complex. Smaller companies present difficulties such as: (1) lower self-financing capacity, due to lower internal generation of resources and (2) greater restrictions on external financing, either due to difficulties in accessing third-party capital or the perception of greater risk by investors when providing own capital. These financial limitations can restrict the amount available for new investments and, consequently, inhibit initiatives to invest in innovation, which often require considerable resources and present high risks (Andries & Czarnitzki, 2014; Chen et al., 2023).

The decision to make this type of investment in smaller companies requires a more careful analysis, considering the potential impacts on cash flow and capital structure. Thus, the size of the company not only influences financial sustainability but also the ability to finance new projects, with repercussions on investment decisions in innovation. Beck & Demirguc-Kunt (2006) argue that there is a positive relationship between company size and investment in innovation.

Return on equity (ROE) and return on assets (ROA) are two indicators that influence the company's financial sustainability and consequently the ability to invest in innovation. A high return on equity indicates that the company generates significant profits in relation to the capital invested by shareholders, which can attract new investments and, thus, facilitate access to financing for investment in innovation. A high return on assets demonstrates a company's efficiency in using assets to generate profits, which can free up funds for investment in innovation. From the above, companies with high return on equity and return on assets tend to have greater financial flexibility, allowing them to allocate resources for research and development without compromising their financial stability (Palepu et al, 2020; Smart et al, 2018).

Fama & French (1993) find that companies with high return on assets (ROA) and return on equity (ROE) tend to attract more investments and, consequently, boost ROA and ROE. Thus, the relationship between the two variables, investment and return, is circular. Companies that invest strategically increase return on equity and return on assets and are more likely to achieve long-term financial sustainability (Uzsoki, 2020). Companies that publicly report their sustainability initiatives tend to have better financial sustainability, including better ROA and ROE, suggesting that investment in innovation can create long-term shareholder value (Eccles et al., 2014).

There is therefore an interrelationship between investment in innovation and profitability, demonstrating the importance of considering CSR criteria in investment decisions to promote long-term sustainability. The literature highlights the growing importance of companies adopting sustainable practices not only as a matter of social responsibility, but also as a smart business strategy, as it contributes to increasing return on assets and return of equity.

Some studies argue for the existence of an interdependent cycle between the financial health of companies, investment and economic activity. Business investment is characterized by its volatility and depends heavily on the performance of the economy. At the same time, the financial health of companies and the resulting level of investment also influence the economic cycle, creating a dynamic and continuous cycle, whose starting point is not easily identified (Farinha & Prego, 2013).

Investment decisions and company financial sustainability cannot be dissociated from macroeconomic conditions. Therefore, variables such as Gross Domestic Product (GDP) are often used to understand this relationship (Nunes et al., 2012). The gross domestic product is an important indicator of economic activity and reflects the influence of several factors, such as government policies, market expectations, and sectoral conditions. These factors directly affect companies' investment decisions and, consequently, their financial results (Nunes et al., 2012).

Being sustainable not only contributes to the well-being of society and the environment, but should also improve financial results, as well as providing the company with greater competitiveness in the market. Therefore, investment in innovation offers companies powerful tools to improve their financial sustainability, allowing them to more efficiently make more informed decisions and adapt to market changes and stakeholder expectations. These relationships are the object of analysis in this study, but applied to companies from countries for which studies are scarce or non-existent.

METHODOLOGY

The objective of this article is to analyse the relationship between investment in innovation and financial sustainability in listed companies in the Iberian Peninsula. Additionally, the existence of other variables, accounting and macroeconomics, that can explain these two variables is analysed. To this end, the following research hypotheses are stated:

[H_1] -	Financial sustainability has a positive and significant effect on investment in innovation in listed companies in the Iberian Peninsula.
[H_2] -	There are other variables, accounting and macroeconomic, referenced in the literature that explain investment in innovation in listed companies in the Iberian Peninsula.
[H_3] -	Investment in innovation has a positive and significant effect on financial sustainability in listed companies in the Iberian Peninsula.
[H_4] -	There are other variables, accounting and macroeconomic, referenced in the literature that explain financial sustainability in listed companies in the Iberian Peninsula.

To test the research hypotheses, two regressions are estimated, with panel data, represented by the following equations (Cumming et al, 2016):

$$INVI_{i,t} = \beta_0 + \beta_1 FS_{i,t} + \beta_2 FS_{i,t-1} + \beta_3 FS_{i,t-2} + \beta_4 SIZE_{i,t-1} + \beta_4 ROA_{i,t-1} + \beta_5 ROE_{i,t-1} + \beta_6 GDP_{t-1} + \varepsilon_{i,t} \quad (1)$$

$$FS_{i,t} = \beta_0 + {}_1 INVI_{i,t} + \beta_2 INVI_{i,t-1} + \beta_3 INVI_{i,t-2} + \beta_4 SIZE_{i,t-1} + \beta_4 ROA_{i,t-1} + \beta_5 ROE_{i,t-1} + \beta_6 GDP_{t-1} + \quad (2)$$

In which the lower indices i and t refer to the company and the year, respectively, the coefficient β_0 is the regression constant, which represents what is not explained by the explanatory variables included in the model and $\varepsilon_{i,t}$ is the disturbance term random model of the company in period t.

The proxy for investment in innovation (INVI) is the same used in other studies, which consists of the quotient between research and development spending and the company's operating result in the same period (Cumming et al, 2016).

Company financial sustainability (FS) measures the company's ability to use resources to obtain returns. This research uses the financial sustainability proxy proposed by Higgins (1981) and used by other authors (Xu et al., 2020).

FS is measured as the product of four indicators: sales margin, asset turnover, payout ratio and capital multiplier, according to equation (3) (Cumming et al., 2016).

$$FS = SM \times AT \times P \times CM \quad (3)$$

The sales margin (SM) is measured by the quotient between gross sales profit and sales (turnover). Gross profit from sales is the difference between sales and the cost of goods sold. This indicator evaluates the operational efficiency of a company's sales in relation to its sales. Asset turnover (AT) is measured by the ratio between revenue and total assets, which evaluates the efficiency with which a company uses its assets to generate sales. If this index presents a high value it indicates that the company is generating more revenue for each unit of asset invested, which suggests an efficient use of the resources available to the company. The payout index (P) is measured by the quotient between dividends and net profit for the year, which evaluates the proportion of a company's net profit that is allocated to dividends. This index is important for investors, as it indicates what proportion of the company's results are distributed. A high payout ratio can be attractive to investors seeking regular returns. However, a high ratio may be unsustainable in the long term, as the company may need to retain part of the profits to reinvest in its activity, particularly in investment in innovation or to face financial challenges. This index must be a compromise between the profitability of its capital holders and the company's investment needs.

The capital multiplier (CM) is measured by the quotient between total assets and net equity, also known as the grain of financial leverage. This indicator assesses the stability of the company's financial structure and the relationship between the interests of shareholders and creditors. A high value for this index suggests greater dependence of the company on debt capital (liabilities), hence greater financial risk as the company is more exposed to the cost of debt capital.

Other variables, accounting and macroeconomic, are also analysed as potentially explanatory of the explained variables, INVI and FS, which were analysed in some empirical studies. The accounting variables are: (1) company size (SIZE), from the natural logarithm of the company's total assets, (2) return on assets (ROA) from the quotient between net profit and assets, which evaluates efficiency of the company in generating results with the total capital made available by the company, and (3) return on equity (ROE) of the quotient between net profit and net equity, which evaluates the efficiency of the company in generating results with the capital made available by the company's capital holders, thus allowing capital holders to know the profitability of their investments. The macroeconomic variable is the gross domestic product, (GDP), the average annual rate of variation of the gross domestic product at market prices of the two countries on the Iberian Peninsula, weighted by the number of companies in the sample from each country. The company's variables depend on its size, a fact that justifies the use of these variables, explained and explanatory, in a quotient to be normalized against the sample. Equation (1) allows us to verify the first two hypotheses and equation (2) the last two research hypotheses.

The EViews Software - version 7 is used to estimate the models and the least squares method is used with panel data, through fixed effects or variable effects according to the results obtained in the Hausman statistical test. If in this test, the null hypothesis is not rejected, at a statistical significance level of 5%, the model is estimated using variable effects, otherwise, that is, if the null hypothesis is rejected, the model is estimated using variable effects fixed effects.

When evaluating the quality of models, some statistical tests are used: (1) individual significance test of model parameters, T-student statistics, (2) coefficient of determination (R^2) and/or adjusted coefficient of determination (R^2a), and (3) global significance test of the model based on F statistics. The level of statistical significance used in statistical tests is 5%.

Sample

The sample used in this study is made up of companies listed in the two European countries that make up the Iberian Peninsula, Portugal and Spain. The analysis period is between 2011 and 2022, totalling 12 years of annual observations. Data were extracted from all companies that make up the Portuguese and Spanish stock market index, PSI and IBEX-35, 16 and 35 companies, respectively. This selection results in a sample composed of 51 companies over 12 years, which makes a total of 612 annual observations. The descriptive statistics and correlation coefficients of the variables under analysis are presented in Table 1. The table presents the descriptive statistics: mean, standard deviation and p-value, as well as the correlation coefficients of the explanatory variables proposed in the models, in the period from 2011 to 2022 of the companies that are part of the PSI and IBEX-35 index. The variables are: (1) financial sustainability -FS of the product of four indicators; sales margin (quotient between gross profit from sales and sales), asset turnover (quotient between revenue and the company's total assets), payout index (quotient between dividends and net profit) and capital multiplier (quotient between total assets and net equity), (2) Investment in innovation - INVI of the ratio between research and development expenses and operating profit, (3) return on assets - ROA of the ratio between net profit and assets, (4) return on equity - ROE of the ratio between net profit and equity, (5) company size - SIZE of the natural logarithm of assets and (6) gross domestic product (GDP) of the average rate of change annual gross domestic product at market prices of the two countries on the Iberian peninsula, weighted by the number of companies in the sample from each country.

Table 1. Descriptive statistics and correlation coefficients of analysed variables

Variable	Descriptive Statistics			Correlation Coefficients					
	Mean	Std.Dev	P-value	FS	INVI	ROA	ROE	SIZE	GDP
FS	**0.8568**	2.5339	0.0453	1					
INVI	**0.6534**	2.8581	0.0307	0.002	1				
ROA	**0.1049**	2.0483	0.0004	0,003	0.001	1			
ROE	0.1314	8.7079	0.6501	0.201	0.067	0.044	1		
SIZE	**13.038**	2.1062	0.0000	0.031	0.123	0.163	-0.001	1	
GDP	**0.0544**	0.05393	0.0000	0.075	0.114	0.012	0.028	0.001	1

The p-value corresponds to the statistical test of the null hypothesis: the mean of the explanatory variable is equal to zero. Means statistically different from zero, at a statistical significance level of 5%, are marked in bold.

In the T test for a statistical significance level of 5% (Table 1), the null hypothesis that the mean of the explanatory variables analysed is equal to zero is rejected. There is only one exception for the return on equity variable that does not reject the null hypothesis, that is, the mean return on equity is statistically equal to zero for a statistical significance level of 5%.

The variables analysed, except for gross domestic product, are very volatile and have a standard deviation greater than their average. These values indicate a large variability in data from the companies in the sample. The efficiency with which companies use their assets to generate results (measured by ROA) presented an average of 10.49%. However, the standard deviation of this variable is considerably higher than the average, which highlights significant differences in the management of companies and the resulting ability to generate returns on their assets. Similar results were observed in return on equity (ROE), although the average of this variable is statistically equal to zero. It is not surprising that the average return on equity is greater than that of return on assets, but the standard deviation of return on equity (ROE) is greater than that of return on assets (ROA), reflecting greater dispersion in the results. The average annual rate of change in gross domestic product (GDP) at market prices, weighted by the number of companies in each country on the Iberian Peninsula, was 5.44%. The correlation coefficients of the variables are low, less than 0.8, thus not showing a problem of multiliniarity (Cohen, 1988). Sogorb-Mira (2005) advocate the exclusion of variables that are strongly correlated with each other to eliminate biases in regression results. This fact does not apply to the variables under analysis, all of which can be included in the models. The low correlation coefficients between the variables suggest that they present behaviours that are predominantly independent of each other, with only a few specific and weak relationships. However, there are some coefficients that, despite being low, stand out for being relatively higher, they are: FS/ROE, INVI/SIZE, INVI/GDP, INVI/SIZE and ROA/SIZE. The ROE/SIZE coefficient is negative, but of reduced magnitude, indicating that the size of the company has a small, but negative effect on the profitability of equity.

Empirical Findings

This section analyses the relationship between investment in innovation and financial sustainability in companies in the Iberian Peninsula in the years 2011 to 2020. The table with the model estimation results, in accordance with the methodology defined in section three, presents: (1) the estimates of the regression coefficients of the two proposed models, (2) the values in parentheses correspond to the p-value to evaluate the statistical significance of each coefficient, (3) the coefficients of determination (R^2) and the adjusted coefficients of determination (R^2a) and (4) the p-value associated with the F statistic to

assess the overall significance of the regression. Statistically significant coefficients, at a statistical significance level of 5%, are marked in bold. Statistical tests were carried out on the estimated models to detect the existence of heteroscedasticity and autocorrelation of residuals. In the White test (Breusch-Pagan) for a statistical significance level of 5%, the null hypothesis of the existence of homoscedasticity is not rejected. The Breush-Godfrey Serial Correlation LM test concludes, at a statistical significance level of 5%, that there is no autocorrelation. Table 2 presents the results of the regressions of equations (1) and (2), with panel data, for companies in the Iberian Peninsula from 2010 to 2022. In both equations, the Hausman statistical test was performed, and the models were estimated by the least squares' method with fixed effects.

Table 2. Model Estimation Results

Explanatory Variables	$Y_{i,t}=\beta_0+\beta_1X1_{i,t}+\beta_2X2_{i,t-1}+\beta_3X3_{i,t-2}+\beta_4ROA_{i,t-1}+\beta_5ROE_{i,t-1}+\beta_6SIZE_{i,t-1}+\beta_7GDP_{t-1}+\varepsilon_{i,t}$	
	Equation (1)	Equation (2)
Constant	**29.13** (0.00)	12.79 (0,07)
$FS_{i,t}$	0.52 (0.82)	
$FS_{i,t-1}$	**0.58** (0,04)	
$FS_{i,t-2}$	**0.66** (0,01)	
$INVI_{i,t}$		**-0.01** (0.05)
$INVI_{i,t-1}$		**-0.01** (0.04)
$INVI_{i,t-2}$		**0,01** (0.05)
$ROA_{i,t-1}$	-9.99 (0.23)	**0.23** (0.05)
$ROE_{i,t-1}$	3.76 (0.98)	**1.51** (0.01)
$SIZE_{i,t-1}$	9.84 (0.09)	0.92 (0.09)
GDP_{t-1}	**1.00** (0.00)	**0.75** (0.00)
R^2	0.25	0.59
R^2a	0.25	0.56
P-value (F)	0.00	0.00

The Table shows the estimates of the regression coefficients and below, in parentheses, the associated p-values. At the end of the table are the coefficients of determination (R^2), the adjusted coefficients of determination (R^2a) and the p-value associated with the F statistic of the global significance of the regression (P-value (F). The sample for estimating the models includes all companies included in the PSI and IBEX-35, in total 51 companies in the period from 2011 to 2022, thus totalling 612 annual observations. The two estimated equations, equations (1) to (2), have as variables: $INVI_{i,t}$, $INVI_{i,t-1}$ and $INVI_{i,t-2}$ is the investment in innovation of company i in year t, t-1 and t-2 respectively, measured by the quotient between research and development expenses and operating profit, $FS_{i,t}$, $FS_{i,t-1}$ and $FS_{i,t-2}$ is the financial sustainability of company i in year t, t-1 and t-2 respectively, the product of four indicators; sales margin (quotient between gross profit from sales and sales), asset turnover (quotient between revenue and the company's total assets), payout index (quotient between dividends and net profit) and capital multiplier (quotient between total assets and net equity), $ROA_{i,t}$ is the return on assets of company i in year t, the quotient between net profit and assets, $ROE_{i,t}$ is the return on net equity of company i in year t, from the quotient between net profit and net equity, $SIZE_{i,t-1}$ is the size of company i in year t, from the natural logarithm of assets and GDP_{t-1} from the average annual rate of change of domestic product gross at market prices of the two countries on the Iberian peninsula, weighted by the number of companies in the sample from each country.

Statistically significant coefficients at a statistical significance level of 5% are marked in bold.

In analysing the relationship between investment in innovation and financial sustainability, two models were estimated, represented by equations (1) and (2). Equation (1) presents investment in innovation as an explained variable and as explanatory variables financial sustainability in the period itself and lagged by one and two periods. While equation (2) presents financial sustainability as an explained variable and investment in innovation in the period itself and a lag of one and two periods as explanatory variables. Both equations also include the explanatory variables return on assets (ROA), return on equity (ROE), company size (SIZE) and gross domestic product (GDP), all in the period itself.

In the model represented by equation (1), Table 1, it appears that the financial sustainability variable, lagged by one and two periods, and the gross domestic product in the period itself, explain investment in innovation, as the beta coefficients associated with each of the variables are statistically significant at a 5% statistical significance level. The results indicate that the company's financial performance in the past positively influences the levels of investment in innovation. However, financial sustainability in the period itself is not statistically significant, suggesting that immediate financial impacts do not directly affect innovation decisions. The variables: return on assets and equity and company size are not statistically significant in explaining investment in innovation; these indicators are not direct determinants of investment in innovation.

In the individual significance test, the null hypothesis for the model constant is rejected, that is, at a statistical significance level of 5% the model constant is different from zero. It therefore indicates that there are other variables not included in the model that may be relevant to explain investment in innovation. In the global significance test, the null hypothesis is rejected, so that the set of explanatory variables proposed in the model are statistically significant in explaining the dependent variable. The adjusted coefficient of determination reveals that the explanatory variables proposed in the model explain approximately 24.6% of the variation in investment in innovation. In the model represented by equation (2) it appears that investment in innovation is statistically significant in explaining financial sustainability, but presents different effects over time. In the current period and one period behind, the impact is negative, suggesting that innovation efforts may represent immediate costs

that compromise financial sustainability. On the other hand, the effect becomes positive when two periods lag, indicating that the returns from innovation tend to materialize in the long term, contributing to the company's financial solidity.

The variables: return on assets, return on equity and gross domestic product, are statistically significant for financial sustainability, the same does not happen with the size of the company. The statistical significance of the ROE and ROA variables in explaining financial sustainability suggests that the company's operational efficiency plays an important role in determining financial stability, the same does not occur with the company's size. The model constant is statistically equal to zero for a statistical significance level of 5%, contrary to what is evident in equation (1), which indicates that the model is well specified, there are no other explanatory variables to explain financial sustainability in addition to those included in the model. In the global significance test, it is concluded that the set of explanatory variables proposed in the model are statistically significant in explaining the dependent variable. The adjusted coefficient of determination indicates that the explanatory variables proposed in the model explain approximately 56% of the variation in financial sustainability. In summary, the models capture important relationships, highlighting the influence of past financial sustainability on innovation investment and the differential temporal effects of innovation investment on financial sustainability. However, the analysis also suggests that other factors not included in the model may play a relevant role in explaining investment in innovation.

DISCUSSION AND CONCLUSION

The objective of this study is to analyse the relationship between investment in innovation/sustainability and financial sustainability in companies in the Iberian Peninsula, as well as the existence of other variables, accounting and macroeconomic, that explain both investment in innovation and financial sustainability. The sample is made up of 51 companies belonging to the Portuguese and Spanish stock market indexes, 16 and 35 companies respectively, from the PSI and IBEX-35, respectively, in the years 2011 to 2022. The methodology used is the estimation of linear regression models multiple, with panel data. The Hausman statistical test is performed on the estimated models and, according to the result of this test based on a significance level of 5%, the models are estimated with fixed effects. In analysing the explanatory capacity of the estimated models, the following are used: the global significance test of the model, the individual significance test and the adjusted coefficient of determination. There are several factors that highlight the importance of this study.

In addition to covering companies for which studies are unknown, they are companies that are part of a society that attaches little importance to cooperative social responsibility, as well as the seventeen sustainable development goals (17 SDGs) of the United Nations (UN). Comparatively, in other countries, there is greater awareness among managers, investors and financiers about the Sustainable Development Goals (SDGs). Understanding the relationship between investment in innovation and financial sustainability is crucial for various groups, such as managers, investors and researchers. Governments can also benefit from the results of this study, using them to develop policies that encourage sustainable growth in line with the 17 sustainable development goals. For investors and academics, the results obtained help in making decisions about the allocation of more efficient resources, identifying investment opportunities and supporting sustainable development.

A company's financial sustainability derives from its ability to generate positive results over time, which covers aspects such as profitability, liquidity, balance sheet strength and the ability to pay debts. On the other hand, investment in innovation refers to the allocation of resources in projects, assets or activities that have a positive impact in environmental, social and cooperative terms (Ziolo et al., 2019; Rizzelloi & Kabli, 2020; Trinks et al., 2020). Companies that demonstrate financial sustainability are increasingly aware of the need for investments in innovation. In the sample under analysis, it appears that the financial sustainability of a company, after one and two periods, is statistically significant in terms of investment in innovation and is, in fact, positive. However, there is no evidence that financial sustainability in the period itself has a direct impact on investment in innovation. Several authors find that when a company demonstrates financial sustainability over a given period, it tends to inspire confidence in investors and financiers. This trust can result in easier access to capital and more favourable financing conditions in subsequent periods (Eccles et al, 2014). The time lag between financial sustainability and investment is because managers, financiers and investors need a certain amount of time to assess the stability of financial sustainability (Ziolo et al., 2019; Rizzelloi & Kabli, 2020; Trinks et al, 2020; Eccles et al., 2014).

Investment in innovation is statistically significant in explaining financial sustainability. It has a negative impact on the period itself and the previous period and a positive impact when two periods lag. This fact was also confirmed by Naqbi et al (2020). These results can be explained by the fact that investment in innovation often requires significant financial resources, which can initially negatively influence the company's financial sustainability. However, over time, these investments tend to generate positive results, contributing to the improvement of the company's financial situation (Naqbi et al., 2020; Bowen et al., 2010; Chen et al., 2016). The variables return on assets, return on equity and company size do not seem to have explanatory capacity for investment in innovation. The only exception is the gross domestic product, which is shown to be statistically significant. But the ROA and ROE variables have explanatory capacity for financial sustainability, as they reflect the efficiency in the use of resources. The return on assets measures a company's ability to generate profits from its total assets, being essential for evaluating operational profitability, regardless of the capital structure. The return on equity indicates the profitability of equity, providing information about the creation of value for shareholders.

Companies with high and consistent return on assets and return ROE tend to demonstrate greater self-financing capacity and financial stability, which contributes to long-term sustainability. Thus, these variables are widely used to predict the financial health and future performance of companies. The company size variable did not demonstrate explanatory capacity for investment in innovation or financial sustainability, perhaps due to the existence of other factors such as the heterogeneity of business strategies and the influence of external variables. Furthermore, financial sustainability is more related to efficient resource management and the macroeconomic environment than to the size of the company. Thus, size

alone does not guarantee a greater propensity to invest in innovation or financial stability, highlighting the need to consider other explanatory variables (Naqbi et al., 2020; Plank & Doblinger, 2018). The gross domestic product (GDP) is a relevant indicator to explain companies' financial sustainability and investment in innovation. The gross domestic product is a relevant indicator that reflects the level of economic activity and macroeconomic conditions that directly affect revenue generation, access to credit, financial stability and consequently investment. The gross domestic product has a positive relationship with investment in innovation, as innovation decisions depend on factors external to the company that affect its internal decisions, such as business strategy, organizational culture and availability of specific resources for research and development (R&D).

Although the results obtained are relevant, it is important to highlight some limitations of this research. Firstly, the sample used only included companies listed in the Portuguese and Spanish market indices. As a result, there may be other factors not considered in this study that could influence the variables under analysis, such as legal, cultural or economic differences between countries, other than just those in the sample. Furthermore, although the work developed allows us to draw some conclusions, as mentioned previously, it also suggests hypotheses and questions that can be explored in future research. A possible direction for future studies would be to overcome the aforementioned limitation, including companies listed on stock exchanges in other countries in the sample, to assess whether the results are similar, or whether they change depending on the companies and their external environment (nationality and societal values), on social responsibility.

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