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THE EFFECT OF TECHNOLOGICAL POSTURE AND CORPORATE SOCIAL RESPONSIBILITY ON FINANCIAL PERFORMANCE THROUGH CORPORATE REPUTATION

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ABSTRACT

This paper analyzes the relationship between a company's technological posture and its commitment to Corporate Social Responsibility (CSR), as a business performance determinant. From knowledge-based and stakeholder theories a structural equations model of relationships was established and statistically tested through SmartPLS on a sample of 76 Spanish firms from the renewable energy sector. The results of the empirical study suggest that the most proactive companies are able to develop better relationships with stakeholders and are more committed to CSR than those firms characterized as being followers or innovation last-movers. Two main reasons are offered in this paper to justify these results: (1) CSR practices help companies to retain their most highly qualified employees, which contributes to maintaining their leadership position; and (2) technological leaders tend to be more highly committed to CSR as a way of collecting valuable knowledge that may be useful to explore new opportunities through innovation, enabling the firm to respond more flexibly to market changes and new stakeholders' needs as well as to changes in their preferences. Moreover, CSR initiatives will contribute to the development of high-value intangible assets such as corporate reputation, which in turn will improve a firm's financial performance.

Keywords: Technological posture; Corporate Social Responsibility (CSR); corporate reputation; Financial performance.

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I

NFLUENCIA DE LA POSTURA TECNOLÓGICA Y LA RESPONSABILIDAD SOCIAL CORPORATIVA SOBRE LOS RESULTADOS FINANCIEROS DE LA EMPRESA A TRAVÉS DE SU REPUTACIÓN

RESUMEN

Este artículo analiza la relación entre la postura tecnológica de la empresa y el compromiso asumido por ésta en términos de Responsabilidad Social Corporativa (RSC) como determinante de los resultados empresariales. Desde el punto de vista de las teorías del conocimiento y los stakeholders, se establece un modelo de ecuaciones estructurales, que es testado estadísticamente a través de la técnica Smart PLS, para una muestra de 76 empresas españolas del sector de las energías renovables. Los resultados empíricos sugieren que las empresas más proactivas desde un punto de vista innovador son capaces de desarrollar mejores relaciones con sus grupos de interés y están más comprometidas con la RSC que aquellas que adoptan una postura seguidora o de último entrante. Así, este artículo señala dos razones fundamentales para justificar estos resultados: (1) Las prácticas de RSC ayudan a las empresas a retener a los empleados más cualificados, aquellos que contribuyen a mantener su posición de liderazgo; y (2) los líderes tecnológicos tienden a estar más comprometidos con la RSC porque consideran que ésta es una forma de conseguir conocimiento valioso y útil para explorar nuevas oportunidades de innovación, permitiendo a la empresa responder de manera más flexible a los cambios del mercado y las nuevas demandas de los stakeholders, así como a los cambios en sus preferencias. Además, las prácticas de RSC contribuirán al desarrollo de activos intangibles altamente valiosos, tales como una buena reputación corporativa, que a su vez mejorará los resultados financieros de la empresa.

Keywords: Technological posture; Corporate Social Responsibility (CSR); Corporate reputation, Financial performance.

INTRODUCTION

Interest in the relationship between innovation and Corporate Social Responsibility (CSR) with regard to sustainability has grown in the last few years (Surroca et al., 2010; Reverte et al., 2016). Consequently, it is frequently argued that CSR should be integrated into business management models since it is useful to justify strategic choices and allows the company to generate valuable strategic intangible assets (e.g. corporate reputation), while taking advantage of the knowledge gained to achieve further innovation (Hart and Sharma, 2004).

CSR literature does not offer conclusive results on the relationship between CSR and business performance (García-Castro et al., 2010;

Liao et al., 2018), mainly because non-financial outcomes of CSR (i.e. corporate reputation, increased employee motivation, or customer satisfaction) have been ignored (Reverte et al., 2016; Castilla-Polo et al., 2018). On other occasions it introduces the issue of innovation as a mediating or moderating variable to explain more adequately this relationship (Surroca et al., 2010; Reverte et al., 2016).

For some researchers, such as Reverte et al. (2016), innovation has a mediating role in the CSR-performance relationship. This study (based on a sample of 133 Eco-Responsible Spanish companies) provides evidence of positive and significant direct effects of CSR on both

innovation and organizational performance across all groups of companies (i.e. manufacturing vs non-manufacturing, proactive vs non-proactive, smaller vs larger and younger vs older firms). For other researchers, such as Boas and Poussing (2016), corporate social responsibility is a driver of Green IT strategies adoption. However, we have not found any study establishing that the technological posture pursued by companies has an influence on its level of adopted CSR commitment.

Thus, in this paper we discuss the integration of CSR into the company's innovation decisions by establishing a model that proposes a direct connection between the organization's technological posture and CSR commitment as a business performance determinant. Our study will revolve around two main questions: (1) Is a company's technological posture (with regard to innovation strategy) positively related to its level of CSR commitment, expressed by the number and intensity of CSR activities? and (2) could the relationship between technological posture and CSR commitment be reflected in a higher level of financial performance through an improved corporate reputation?

In this paper we establish that technological leaders have an important incentive to introduce CSR practices as it will help them to attract and retain more highly qualified employees and to improve financial performance through earning a positive corporate reputation. Moreover, technological leaders will adopt a high commitment to CSR in order to collect valuable knowledge that can be useful for exploring new opportunities by means of innovation.

We have chosen the renewable energy industry due to it being a dynamic and innovative sector, particularly sensitive to CSR actions, where corporate reputation plays an essential role as an element of differentiation. Moreover, this industry is of great importance to the Spanish Economy, to which the contribution to GDP was around 1% in 2017. This study aims to aid companies in this industry to realize the importance of CSR linked to the innovation process as a tool to add value to their operations, while behaving ethically.

The structure of the paper is as follows. First, we establish theoretically the relationship between CSR, innovation strategy (from a technological posture viewpoint), corporate reputation and financial performance. Second, we describe the various measurement scales and develop our own scale with which to measure CSR. Next, we empirically analyze, through the SmartPLS technique (Ringle et al., 2005), the relationship between these variables in a sample of 76 Spanish companies during the period 2010-2012. Finally, we will draw some practical implications and conclusions on how the combination of technological posture and CSR commitment may become a key factor in improving corporate reputation and financial performance for companies in certain industries.

THEORETICAL BACKGROUND AND HYPOTHESES

Technological posture and corporate social responsibility

When technological posture is analysed, the innovation strategy that a company can pursue ranges from aiming to be a pioneer in the technological market to being a follower or last mover (Adler, 1989). A technological leadership posture is based on a dynamic policy in R&D. It is founded on the ability to identify new market needs and discover how to satisfy them. Companies developing a proactive strategy assume great risks and therefore expect to get high returns. However, not every company can implement such a strategy as it requires technological innovation ability and the capacity to identify new market opportunities and rapidly translate them into commercial products (Min et al., 2006).

A proactive strategy requires significant and continuous efforts to maintain a company's leadership position. Otherwise, a company may only succeed in creating a market for the competition (Min et al., 2006). Thus, a technological leadership posture reaps considerable advantages for a company but also incurs disadvantages. Companies that adopt a pioneering posture benefit from the reduced competition existing in an industry but also face

costly errors resulting from lack of information and knowledge (Hawk et al., 2013).

On the other hand, late movers tend to benefit from the information and knowledge available following the early movers' successes and failures, but they also face high costs resulting from the pioneers anticipation, such as not being able to choose the prime locations because they have already been taken, they are unable to choose the best employees because they have already been taken on by the pioneers, they have greater difficulty in establishing privileged agreements with crucial suppliers and in breaking the consolidated relationships between customers and producers (Lieberman and Montgomery, 1988, 1998; Hawk et al., 2013). Therefore, bearing in mind that a technological leadership posture has advantages and disadvantages for the company, in this paper we establish that technological leaders who adopt a significant CSR commitment are able to take better advantage of their leadership position and so minimize their risks (eg. attracting the best employees or establishing privileged agreements with suppliers, customers and other stakeholders).

Although the relationship between CSR and innovation has been analysed and found to be significantly positive in many cases (e.g., Padgett and Galán, 2010; Wagner, 2010), CSR literature does not provide conclusive results about the nature of this relationship, and inconclusive findings have been offered by scholars (García-Castro et al., 2010; Surroca et al., 2010). In some of these papers, CSR has generally been considered as an explanatory variable of the innovation strategy (Bear et al., 2010). In other cases, innovation strategy has been measured by investment in R&D (without considering the technological posture viewpoint). Thus, we find a lack of studies that show how innovation strategy (particularly the technological posture) can be related to CSR with a view to improving a company's performance.

Some authors propose a virtuous circle between CSR and innovation that can be useful for both the search for higher profits (the most common reason) and fulfilling those company values that are in line with socially responsible measures (MacGregor and Fontrodona, 2008).

For instance, Padgett and Galán (2010) showed that R&D intensity positively influenced CSR.

Wagner (2010) also found that CSR oriented-innovation led to high social benefits. Thus, innovations leading to high social benefits are driven by the company's CSR activities, as socially responsible actions enable the company to hire more innovative employees, which in turn positively affects the firm's innovation level (Williamson et al., 2006) and thus improves their corporate reputation. In this sense, proactive companies in CSR tend to be technological leaders in their industries and generally surpass those companies which adopt reactive postures in relation to innovation strategy when it comes to carrying out social actions (MacGregor and Fontrodona, 2008). Guadamillas and Donate (2011) even suggest the integration of CSR into the innovation strategy, as innovative actions should always be adjusted to the stakeholders' needs and expectations. In this sense, socially responsible behaviour can ensure that companies maintain or even improve their long-term innovative results, their reputation and image as responsible companies as well as underpinning their legitimacy with stakeholders, who will become implicated with them more actively in the innovation development process (Guadamillas and Donate, 2011).

Other authors, such as Frondel et al. (2007), found that environmental CSR was contributing to the development of strategic capabilities in many industrial firms, which enabled them to carry out leading innovation developments based on cleaner production technologies. In line with this approach, Guoyou et al. (2013) found that the demands of particular stakeholders encouraged companies to develop CSR activities by means of proactive innovation, which in turn resulted in green innovations and leadership positioning in environmental technologies. Therefore, the integration of CSR into innovation strategy is a dynamic process in which a high socially responsible commitment facilitates the detection, assessment and analysis of changes in the stakeholders' needs and expectations (González-Ramos et al., 2014).

From this perspective, our viewpoint is that knowledge acquired from relationships with stakeholders can be exploited in the innovative

field (e.g., green innovation) when the company is more proactive and pursues a technological leadership posture. Thus, we think that the search for technological leadership will increase the significance of relationships with stakeholders so that valuable knowledge can be gathered which can be useful for exploiting opportunities through innovation. Thus, the company obtains a good reputation in the industry, staying at the forefront of changes and product or process development and thereby improving its financial performance.

Consequently, technological leaders (the most proactive companies) which are able to create high-quality relationships with their stakeholders, will develop more R&D actions which take advantage of these relationships, for example, to gain energy efficiency and reduce CO₂, and will therefore improve their business performance. In other words, they will be able to focus on numerous sustainable development practices in an effort to improve their corporate reputation and their financial performance. Thus, based on the literature review, we establish the first hypothesis:

H1: The more a firm is oriented towards a technological leadership posture, the greater its level of CSR commitment.

The mediating role of reputation in the relationship between CSR and a firm's financial performance

Corporations in all parts of the world have begun to develop an increasing awareness of the importance of corporate social responsibility (Liao et al., 2018). CSR is a discretionary allocation of corporate resources towards improving social welfare that serves as a means of enhancing relationships with stakeholders (Barnett, 2007, p.801). Most companies which take an interest in CSR do so from a strategic viewpoint because they consider it to be a very powerful management tool (Porter and Kramer, 2006; Surroca et al., 2010; Guadamillas and Donate, 2011).

Empirical studies on this subject have evolved from research on what CSR is and why companies decide to implement it, to empirical studies that try to prove and explain the

relationship between CSR and financial performance (Waddock and Graves, 1997; Tsoutsoura, 2004; De la Cuesta, 2004; Porter and Kramer, 2006; Hull and Rothenberg, 2008; Castilla-Polo et al., 2018; Liao et al., 2018). The fact is that, despite the prolonged efforts to demonstrate a positive relationship between CSR and financial performance, research is still largely inconclusive, due to measurement errors, insufficient data, or misspecified models in which variables that may mediate or moderate the relationship are omitted (García-Castro et al., 2010; Surroca et al., 2010; Reverte et al., 2016).

Some recent studies find a negative relationship between CSR and financial performance. This is the case of Liao et al. (2018), who seek to clarify the short-term relationship between Corporate Social Performance (CSP) and Corporate Financial Performance (CFP). The data in this study (based on the construction industry) reveals a negative association between CSP and CFP during the six years under study. Findings indicate that international contractors should prioritize the CSR on issues which they intend to focus so as to minimize their financial risks and maximize future CSR performance. It is thus important to develop additional research in this direction to try to clarify the relationship between CSR and financial performance.

Other empirical studies establish that the relationship between CSR and business performance is mediated or moderated by the corporate reputation (Bear et al., 2010; Melo and Garrido-Morgado, 2012; Castilla-Polo et al., 2018). Along these lines, Castilla-Polo et al. (2018) analyse 76 cooperatives in Spain and show that reputation is directly and positively related to the performance of the cooperatives.

These findings are useful for positioning corporate reputation as a novel key performance indicator and a differentiating element. However, other authors such as Yoon et al. (2006) point out that CSR does not have a positive effect on companies that already had bad reputation.

Corporate reputation is an intangible asset that offers an image of responsibility and commitment to stakeholders to cover their expectations. Thus, a company with a good

reputation will generate a climate of trust with stakeholders that will be helpful in establishing relationships (Orlitzky et al., 2003; Tsoutsoura, 2004; Husted and Allen, 2007).

Previous empirical studies argue that a high CSR commitment contributes to attracting and retaining high quality employees, reducing business risks, increasing business efficiency, improving corporate reputation and so facilitates access to socially responsible investment funds, and also increases market opportunities (Husted and Allen, 2007; Bear et al., 2010;

Melo and Garrido-Morgado, 2012). These milestones are possible to achieve because, among other aspects, companies that develop CSR initiatives may improve relationships with stakeholders and avoid costly conflicts of interest (Husted and Allen, 2007; Freeman et al., 2010), at the same time as capitalizing on their innovative capabilities (Surroca et al., 2010). In turn, these findings were obtained since socially responsible behaviour earns organizations a good reputation and improves their image and relationships with stakeholders (Bear et al., 2010). Thus, these kinds of valuable intangible resources allow companies to obtain sustainable competitive advantages that are useful to set them apart from other firms (Barney, 1991; Surroca et al., 2010; Melo and Garrido-Morgado, 2012).

After examining the previous literature, we are ready to propose the second hypothesis of our model, pointing out the existence of a positive relationship between CSR and financial performance, mediated by corporate reputation.

H2a: CSR practices are positively related to a firm's corporate (good) reputation.

H2b: (Good) Corporate reputation is positively related to a firm's financial performance.

METHODOLOGY. RESEARCH DESIGN

To test our hypotheses we used a Structural Equation Model (SEM). These kinds of models allow researchers to analyze relationships between compound theoretical constructs (Fornell and Larcker, 1981). In this study, we will use the program SmartPLS 3.0., developed by Ringle, Wende and Becker (2014).

Sample

The starting population included 726 companies involved in renewable energy activities in Spain. Specifically, six activities were considered: (1) energy generation; (2) manufacturing of technological components; (3) engineering activities; (4) marketing and export of components; (5) energy consulting; and (6) installation and maintenance activities. However, these six activities can be grouped into just two blocks, production (the first three) and services (the last three).

Secondary data from these companies were obtained from two Spanish specialized directories (the IDAE and the Directorio Especializado en Empresas de Energías Renovables from the Spanish Industry Ministry). There are two main reasons to use this set of related activities in this study: (1) Renewable energy activities are very sensitive to CSR activities since their products, processes and services have high impacts in economic, social and environmental terms; (2) their great importance for the Spanish Economy, where the contribution to GDP was around 1% in 2017. This set of industries reveals a panorama of the renewable energy sector in Spain, where CSR implementation is significant from both business and governmental viewpoints. Moreover, this is an emerging sector and R&D investments and innovative strategies based on CSR are expected to be an important aspect for firms, as survival and competitive advantages are closely dependent upon it.

Based on an extensive literature review, we designed a questionnaire with different measures for technological posture (innovation strategy), CSR, corporate reputation and financial performance. We launched an on-line survey in September 2012.

An e-mail was sent to the companies along with an invitation to participate in the study and a direct link to the questionnaire, emphasizing that it should be filled in by a member of senior management.

By December 2012 we had collected 76 valid questionnaires, which represented a response rate of 10.47% (see table 1). Although this might initially appear to be a low response

rate, according to management literature it is acceptable because of the low incentive for companies to respond to this type of survey. Business literature usually considers 10 to-20 percent to be a valid response rate in papers with data collected through questionnaires (see for example Zahra and Bogner, 1999; Chow and Chen, 2012).

Finally, in order to test for non-response bias, differences between respondents and non-respondents were examined for the study. T-tests did not show significant differences either in relation to size ($t= 0.698$; $p< 0.91$) or age ($t= 0.802$; $p< 0.74$).

Since all data were self-reported and collected through the same questionnaire with a cross-sectional research design, common method variance –variance that is attributed to the measurement method rather than the constructs of interest– may cause systematic measurement error and bias in the estimation of the relationships between theoretical constructs

(Podsakoff and Organ, 1986). We therefore applied a Harman one-factor test (through exploratory factor analysis) to check for potential issues of common method variance in this study. For this test, a substantial amount of common method variance is present either (1) a single factor emerges from the factor analysis, or (2) one general factor accounts for the majority of the covariance between the variables (Podsakoff and Organ, 1986).

The factor analysis (principal component analysis with varimax rotation) on the questionnaire items showed seven distinctive factors with eigenvalues greater than 1.0, accounting for 75.34% of the total variance. Moreover, the first (largest) factor accounted for 22.47%. Since a single factor did not emerge and one general factor did not account for the majority of the total variance, common method variance is not of great concern and it is thus unlikely to lead to misinterpretations of the study results.

Table 1. Technical details of the research

Population	Spanish companies in the renewable energy sector (726 firms)
Geographical area	Spain
Sample size	76 firms
Collection method	Online questionnaire and phone contact
Response rate	10.47%
Sample error	10.64%
Reliability level	95%; $z= 1.96$; $p=q=0.5$
Date of fieldwork realization	September- December 2012

Measures

A. Technological posture

In this paper, “technological innovation strategy” is understood as a posture for technological leadership or technological pioneers with regard to introducing new products or services onto the market. Accordingly, it is expected that a proactive approach provides an advantage, not only in the sense of the perpetrators being the first mover in the market, but also due to their greater commitment to the dedication of company resources to the development of technological capabilities (Zahra and Covin, 1993).

For this measure, four items were adapted from the scales developed by Zahra and Das (1993), and Zahra and Bogner (1999). This measure tries to reflect the innovation strategy proactivity of the company, including aspects such as being the first to market technologies rather than being a follower or last mover, the innovation proactivity or the efforts dedicated to gaining a reputation of technological first-mover in the market (see Table 2).

B. Corporate Social Responsibility

After several decades of research on CSR, one of the main problems appearing in the literature review on this topic is still its

measurement. CSR has usually been measured by a socially responsible index (eg. KLD), regardless of its three main dimensions. However, in this paper we have developed a scale based on twenty-three items to measure CSR as a second-order formative construct by considering the most commonly accepted dimensions in the literature –economic, social and environmental.

For the environmental dimension of CSR, nine items were taken and adapted from the measures elaborated by Bansal (2005) and Chow and Chen (2012). This scale included aspects relating to efforts for reducing negative impacts from the company’s activities, selection of responsible suppliers, or the use of environmental friendly inputs.

For the economic dimension, eight items were adapted from the measure designed by Bansal (2005). In this case, the scale tried to include aspects relative to benefits for stakeholders derived from the company’s business activities, such as benefits for employees (e.g., training, fair human resource practices), or value creation for customers from final products and services.

Finally, for the social dimension, six items were adapted from the measure designed by Chow and Chen (2012). The scale tried to reflect the company’s social commitment regarding the community, protection of rights or the efforts dedicated to learning from the needs of its stakeholders, among other questions (see Table 2).

C. Corporate reputation

For corporate reputation, we have based our measurement on the scale developed by Delgado et al. (2011). We have focused on product reputation, financial reputation and management reputation.

D. Financial performance

Traditionally, many papers have used the return on equity or financial profitability (ROE) and the return on sales (ROS), to measure the financial performance (Waddock and Graves, 1997; Tsoutsoura, 2004). The former, ROE or profitability, is a measure that reflects the return on capital after deducting all expenses, and indicates the company’s success in the effective use of their resources to obtain profit (Zahra, 1996).

On the other hand, an increase in ROS in a company could be due to a higher margin of profit achieved through product differentiation or through innovation (Zahra and Bogner, 1999, p.156). We also believe that this differentiation may be caused by the implementation of CSR practices.

We have also included a growth measure. This being sales growth, which shows us the market acceptance of the company’s products. It is therefore an indicator of successful company expansion through innovation and CSR (Zahra and Bogner, 1999, p.156).

Table 2. Research items

Corporate Social Responsibility (CSR). (From 1-very low to 5-very high).		Papers which also use the variable
CSR (Environmental). Importance given by the company in the last three years to:		
CSREnv1	...ensure that the final product will reduce its negative impact on the environment, as compared to previous years or competitors.	
CSREnv2	...the use of less environmentally harmful inputs, as compared with previous years and with its competitors.	
CSREnv3	...the choice of inputs from renewable sources versus non-renewable materials or chemical components.	
CSREnv4	...reduce the likelihood of environmental accidents through process improvements.* ¹	<ul style="list-style-type: none"> ▪ Bansal (2005) ▪ Chow and Chen (2012)
CSREnv5	...reduce waste emission through streamlining processes.	
CSREnv6	...use some waste materials as inputs for their own processes.	
CSREnv7	...responsibly dispose unusable waste.	
CSREnv8	...the handling and storage of toxic waste materials responsibly.	

¹ Removed items are marked with (*)

CSREnv9	...choose suppliers meeting environmental requirements.	
CSR (Economic). Importance given by the company in the last three years to:		
CSRReco1	...strengthen relationships with the community and the government (through philanthropic activities, volunteer programs, disclosure of social and environmental practices, etc.), in order to reduce legislative demands and protect their interests.	
CSRReco2	...reduce input costs for a similar manufacturing level.	
CSRReco3	...reduce waste management costs for a similar manufacturing level.*	
CSRReco4	...differentiate their products by promoting their environmental concern.*	▪ Bansal (2005)
CSRReco5	...sell waste materials.*	
CSRReco6	...increase productivity and employee loyalty by offering fair wages and equal opportunities.	
CSRReco7	...increase productivity and employee loyalty by offering training and promotion opportunities.	
CSRReco8	...increase sales and customer loyalty by carrying out a truthful advertising, selling safe products, paying attention to complaints and researching to offer high-quality products.	
CSR (Social). Importance given by the company in the last three years to:		
CSRsoc1	...take into account the needs of its stakeholders when making investment decisions by establishing a formal dialogue with them.*	
CSRsoc2	...communicate the risks and the environmental impact of its activities to the community.	
CSRsoc3	...help to improve the community's health and safety.	▪ Chow and Chen (2012)
CSRsoc4	...protect the local communities' rights and claims.	
CSRsoc5	...improve the visual appearance of the firm's facilities with the aim of integrating them into the environment in which it operates and to improve citizens perception.	
CSRsoc6	...recognize and respond to the need to raise funds for local community initiatives.	
Technological posture. Importance given by the company in the last three years to:		
Tech1	...market new (or improved) technologies (products or processes).	
Tech2	...be the first to introduce new or improved products on the market.	▪ Zahra and Das (1993) ▪ Zahra and Bogner (1999)
Tech3	...gain a (good) reputation in the industry of leading changes or product improvements.	
Tech4	...develop skills to introduce new (or enhanced) products or develop new processes (or enhanced) before competitors.	
Corporate reputation. During the last three years...		
Rep1	my company's reputation, regarding the quality of our products, is among the best in the industry.	
Rep2	the reputation of my company's administration and management is among the best in the industry.	▪ Delgado et al. (2011)
Rep3	my company's financial reputation is among the best in the industry.	
Business performance. Assess the results obtained by your company in the last three years in relation to:		
Growth1	...average annual growth in sales for the last three years.	
Growth2	...average annual sales growth over the past three years, compared to its closest competitors.	▪ Zahra and Bogner (1999)

Growth3	...average annual growth in sales for the last three years, compared with the industry average.	
ROS1	...average return on sales in the last three years.	▪ Waddock and Graves (1997)
ROS2	...average return on sales in the past three years, compared to its closest competitors.	▪ Zahra and Bogner (1999) ▪ Tsoutsoura (2004)
ROS3	...average return on sales in the last three years, compared with the industry average.	
ROE1	...average return on equity of your company in the last three years.	▪ Zahra (1996)
ROE2	...average return on equity of your company in the last three years, compared to its closest competitors.	▪ Waddock and Graves (1997) ▪ Tsoutsoura (2004)
ROE3	...average return on equity of your company in the last three years, compared with the industry average.	

E. Control variables

Size was measured through the natural logarithm of the number of employees. Size was included in the model as a control variable since financial performance is usually affected by the firm's dimension (Zahra and Das, 1993; Zahra and Bogner, 1999). Efforts in CSR could be also influenced by size, as the firm has to satisfy the goals of a greater number of stakeholders (Carroll, 1999).

The type of activity carried out by the company has also been considered as a control variable. The sample of companies has been divided into two main groups of activity: production and services.

We consider it is important to include this variable in the analysis because it could determine the results. Thus, in order to operationalize the belonging of companies to the two subgroups considered, companies included in the production group will be given a value of one (dummy variable), while companies included in the services group will be given a value of zero.

STATISTICAL ANALYSIS

We utilized the Partial Least Squares (PLS) approach to Structural Equation Modeling (SEM) to test the hypotheses of the study. The PLS path method is typically applied in two stages: (1) The analysis of the measurement model; and (2) the analysis of the structural model. The measurement model is estimated using

confirmatory factor analysis in order to assess reliability and validity of the theoretical constructs, while the structural model is estimated to analyze the associations hypothesized in the research path model. In this study, we used the statistical software Smart PLS 2.0, developed by Ringle, Wende and Will (2005).

Measurement model

In this paper we consider all the constructs as being reflective except CSR, which is measured as a second order construct (a reflective-formative type, as classified by Jarvis et al. 2003). Following the PLS methodology, first of all we need to check the reliability and convergent and discriminant validity of the reflective constructs (Tenenhaus et al., 2005). This analysis tries to verify whether the theoretical concepts are properly measured by the observed variables or not.

A. Reliability of the reflective constructs

This analyzes the correlation between indicators used to measure a construct. The reliability indicators are shown in Table 3. Both the composite reliability index (CRI) and Cronbach α offer acceptable values, exceeding the recommended levels of 0.8 and 0.7 respectively (Gefen and Straub, 2005), so the reliability of the formative constructs seems to be acceptable for this study and it verifies the model constructs' internal consistency.

Table 3. Measurement model: Reliability and convergent validity

	Cronbach α	CRI	AVE
Technological posture	0.9088	0.9358	0.7849
CSR environmental	0.925	0.9386	0.6571
CSR economic	0.8467	0.8922	0.6259
CSR social	0.8644	0.9023	0.6492
Corporate Reputation	0.8938	0.9339	0.825
Financial performance	0.9573	0.964	0.7494

B. Convergent and discriminant validity of the reflective constructs

Convergent validity is defined as the degree to which concepts that theoretically should be related, are in fact related to each other. So, it is considered that there is convergent validity when items are strongly correlated with their original theoretical construct (Gefen and Straub, 2005). In this model, convergent validity is analyzed by means of the loading weight of each indicator (item) on the latent variable (Chin, 1998; Tenenhaus et al., 2005) and the average variance extracted (AVE).

The higher the indicator's loading is, the greater the evidence of the construct's validity. In this paper we removed five CSR items (CSReco3, CSReco4, CSReco5, CSRsoc1 and CSRenv4) since they did not meet the

convergence validity criteria of being above 0.6 (Falk and Miller, 1992). Regarding the AVE, all the values are above the recommended threshold of 0.5 (see Table 3). Convergent validity is thus assured for the study's model.

For discriminant validity assessment, Fornell and Larcker (1981) suggested the criteria that the square root of the AVE of a latent variable should be greater than the correlations between the remaining latent variables. As Table 4 shows, discriminant validity is confirmed for our model, as the square root of the AVE for each construct was greater than the correlations involving the construct, as values range from 0.625 to 0.825.

Table 4. Descriptive statistics and discriminant validity

	Mean	SD	VIF	Tech. posture	Envir. CSR	Social CSR	Economic CSR	Corporate reputation	Financial performance
Tech. posture	4.08	1.01	1.39	0.886					
Environm. CSR	3.77	1.17	2.61	0.4764	0.8106				
Social CSR	3.42	1.21	3.39	0.3664	0.755	0.8057			
Economic CSR	3.54	1.17	2.62	0.4573	0.6435	0.7614	0.7911		
Corporate reputation	3.69	0.95	1	0.5762	0.4285	0.4781	0.5736	0.9083	
Financial perform.	3.08	0.95	1.5	0.2746	0.1342	0.2643	0.3595	0.5507	0.8657

Diagonal: square root of the average variance extracted (AVE)

Below the diagonal: correlations between factors

In italics: VIFs of the formative construct (CSR)

C. Validity of the formative constructs

In contrast to reflective constructs where collinearity between indicators is required, in formative constructs the presence of high

correlations between the indicators is not desirable (Chin, 1998). To check collinearity for the formative constructs, some scholars suggest the use of variance inflation factors (VIF), which measure the effect of collinearity between the

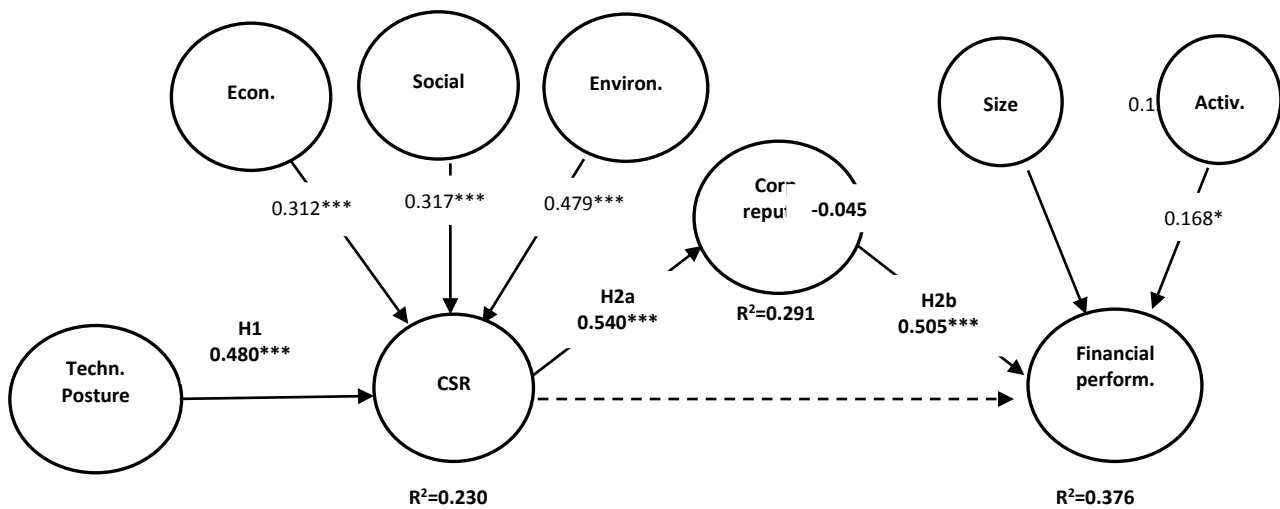
predictor variables in a regression model (Diamantopoulos and Siguaw, 2006).

For formative constructs, acceptable VIF values should be lower than 5 (Hair et al., 2013). In our study, all the values are below 5, with the highest VIF value for CSR (social dimension) being 3.39.

Structural model analysis

To assess the structural model it is necessary to estimate the path coefficients or standardized regression weights (β), which show the significance and strength of relationships between independent and dependent variables. The structural model validity is usually checked in three ways: (1) Student's *t* statistics; (2) significance levels of path coefficients; and (3) R^2 value for each dependent variable (see Figure 1).

Figure 1. Research model and results



* $p < 0.05$ ($t(0.05; 499) = 1.645$); ** $p < 0.01$ ($t(0.01; 499) = 2.327$); *** $p < 0.001$ ($t(0.001; 499) = 3.092$)

The path coefficients exceed the value of 0.3 for all the hypotheses. These results support the existence of a close relationship between technological posture, CSR, corporate reputation and financial performance. In addition, these hypotheses are accepted with $p < 0.001$. Therefore, we can affirm that the more a firm is oriented towards a technological leadership posture, the greater its CSR commitment is ($\beta = 0.480$, $p < 0.001$). Moreover, the results show that the greater the company's CSR commitment is, the greater their corporate reputation is ($\beta = 0.540$, $p < 0.001$) and therefore the greater their financial performance is ($\beta = 0.505$, $p < 0.001$).

When we introduce the corporate reputation in the analysis, the direct relationship between CSR and financial performance ceases to be significant as a result of the total mediator effect exerted by the corporate reputation between these variables.

Regarding the predictive power of the model, goodness of fit is determined by the strength of each structural relationship, analyzed by means of the R^2 value (Falk and Miller, 1992). In Figure 1 we can see all the dependent variables with R^2 values higher than 0.1, which seems to indicate that the model has enough predictive power (Chin, 1998).

In this regard, technological posture explains 23.04% of the CSR's variance. CSR in turn explains 29.16% of corporate reputation's variance and finally, corporate reputation explains 27.72% of the variance in financial performance.

In order to assess the model's predictive relevance it is also necessary to apply the Stone-Geisser test (Q^2). According to Chin (1998), a construct predictive power is relevant if the test offers values of $Q^2 > 0$, which is confirmed for the

three dependent variables of our model (see table 5).

Table 5. Relevance of the predictive model and effect on the dependent variables

DEPENDENT VARIABLE	R ²	Q ²	Direct effect	Correlation	Variance explained
CSR	0.230	0.2134			
H1: Technological posture → CSR			0.480	0.480	23.04%
Corporate reputation	0.291	0.1273			
H2a: CSR → Corporate reputation			0.540	0.540	29.16%
Financial performance	0.376	0.2473			
H2b: Corporate reputation → Financial performance			0.505	0.549	27.72%

Finally, size (measured as the logarithm of the company's number of employees) and the type of activity (dummy variable) were included in the model as control variables. The results show that both variables have a significant influence for financial performance ($\beta = 0.152$, $p < 0.001$; $\beta = 0.168$, $p < 0.001$). However, the inclusion of company size and the type of activity into the model does not modify the significance of the relationships between technological leadership, CSR, corporate reputation or financial performance for this study.

DISCUSSION

Based on this paper's results, we have found that there is a significant positive relationship between CSR and financial performance. We can thus state that CSR development does not only contribute to attract and retain high-quality employees and increase the efficiency of a company, but it also increases its corporate reputation and thus its financial performance. The reason for this is that companies adopting CSR improve relationships with stakeholders and avoid costly conflicts of interest (De la Cuesta, 2004; Tsoutsoura, 2004; Freeman et al., 2010). At the same time, they take advantage of their innovative capabilities to develop green innovations and improve their corporate reputation (Orlitzky et al., 2003; Surroca et al., 2010; Castilla-Polo et al., 2018).

The relationship between technological posture and CSR mainly benefits green innovations and the development of intangibles assets, such as (good) corporate reputation, that are related to competitive advantages for companies. In other words, relationships with stakeholders may be better exploited in an

innovative area where the company is very proactive with regard to the introduction of new products into the market and development of technological processes. Therefore, the search for technological leadership will be reinforced by establishing (good) relationships with stakeholders deriving from CSR. As a result, new products or processes will make the company more competitive, improving their corporate reputation and thus improving their long term financial performance. Furthermore, the results obtained can exemplify how CSR may be used as a strategic tool in order to be more innovative. Although environmental characteristics are different between countries in certain aspects (e.g., governmental regulation, innovation clusters), the perspective of this study is universal in the sense that knowledge is the firm's main strategic asset (Drucker, 1995) and innovation is a source of competitive advantage.

Governments all around the world should be aware of the power of knowledge for economic development and they should enact political initiatives that contribute to developing an environment for knowledge exchange and the generation of trust between agents. Especially in industries which are sensitive to CSR aspects, these exchanges will be key elements for firms to be able to achieve competitive advantages based on innovation.

CONCLUSION

The main contribution of this paper is the proposal of a new perspective on the relationship between CSR and innovation strategy in which both variables are related in order to create competitive advantages for firms and contribute to social welfare.

In general, this paper aims to contribute to the debate around the relationship between CSR and financial performance, with the objective of unveiling the most effective ways for companies to combine CSR and innovation to achieve competitive advantages. Moreover, although this research has used a sample of Spanish companies in the renewable energy sector, we believe that the proposed argument is applicable to other technological industries in which technological leaders are seriously committed to CSR. These firms will be able to benefit from knowledge provided by their stakeholders in order to achieve further innovation. This commitment will probably contribute to maintaining their leadership position, improving their corporate reputation as well as enhancing their financial performance.

As a limitation of this study we can point out the following. First, the necessity to obtain primary data from questionnaires requires research design to be cross-sectional for this study. This may hinder the observation of the long-term effects of CSR on financial performance. Although we tried to solve this problem by including a three year consideration for all the independent variables, the problem of causality concerning the hypothesized relationships has to be taken into account. Future research might address this issue by using a longitudinal design to establish causal inferences between CSR and financial performance. Another limitation is that we have collected data during the economic crisis and after the legislative change in Spain relating to the renewable energy industry (2010-2012), which could have affected the results obtained.

And finally, this study has been applied only to the renewable energy industry and the results cannot necessarily be extended to other industries. Moreover, in future papers we will try to introduce additional variables and improvements in the model, such as environmental dynamism or knowledge strategy (exploration and exploitation).

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