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# **The influence of financial performance on corporate social innovation**

## **Abstract:**

The study draws from the literature on corporate social innovation (CSI) and financial performance and extends previous studies about this relationship. In addition, given the scant literature on corporate social innovation, the paper tries to generate a common framework for this topic. It proposes a definition and a measure of CSI. The measure aims to reflect the contribution that firms make to society in terms of innovation. The sample includes firm observations that cover six-year longitudinal panel data, including 1,122 firms in 29 countries. Our findings confirm that firms invest their financial resources (mainly firm performance) in CSI, but instead of investing immediately take at least one year to do so. Stakeholder engagement, the relevance of sustainable innovation business models, and social and environmental policies contribute to integrating CSI. Our study contributes to filling the gap in the literature on CSI and provides several implications for NGOs, managers and policymakers.

**Keywords:** Financial Performance; Corporate Social Innovation; Corporate Social Performance; Environmental policy; Stakeholder engagement; Sustainable development

## 1. Introduction

Social innovation is changing the paradigm for studying innovation. Its impact on society and the concept itself are becoming important and fruitful subjects of research (Avelino *et al.*, 2017; Cajaiba-Santana, 2014; Igarashi & Okada, 2015; Neumeier, 2012; Segarra-Oña *et al.*, 2017). However, social innovation (SI) is a complex construct that lacks a unifying paradigm in the social sciences (Turker & Altuntas, 2017). We consider social innovation to include innovations by governments, firms, or individuals who contribute in new technological, environmental, and social ways to improving the quality of life for society while also generating sustainable economic benefits. We focus our research on the role of firms and their capacity to improve living standards by means of investing their resources in innovation. Previous literature (Herrera, 2015; Mirvis *et al.*, 2016; Rexhepi *et al.*, 2013; Ulinski, 2015) calls this concept “Corporate Social Innovation” (CSI).

Many authors acknowledge the benefits of CSI for business and society (Herrera, 2015; Lisetchi & Brancu, 2014). Despite the confusion surrounding this concept, scholars underline the importance of social innovation for business strategy (van der Have & Rubalcaba, 2016; Westley & Antadze, 2010), for enhancing firms’ performance and benefits to society (Cegarra-Navarro *et al.*, 2016; van Beurden & Gossling, 2008), for improving technology (Hall *et al.*, 2014; Igarashi & Okada, 2015) and environmental policy conditions (Mirvis *et al.*, 2016; Rennings, 2000), as a fundamental part of a new business model (Schaltegger *et al.*, 2012), and, more generally, for improving the quality of life for society (Avelino *et al.*, 2017; Cegarra-Navarro *et al.*, 2016; Edwards-Schachter *et al.*, 2012).

Social innovation is now seen as an important element in a society’s quality of life as well as an essential component of firms’ strategies (Dossa & Kaeufer, 2014;

Rodgers *et al.*, 2013). In line with arguments on the theory of shared value proposed by Porter and Kramer (2011), some authors have emphasized the importance of social innovation for the success of firms. Related theoretical papers have suggested a relationship between social investments or corporate social performance and corporate financial performance (Crane *et al.*, 2014; Wilson & Post, 2013) and the influence of stakeholders in creating CSI (Mirvis *et al.*, 2016; Segarra-Oña *et al.*, 2017). This study focuses on firms' capacity to invest their resources (mainly corporate financial performance) in CSI, that is, their role as generators not only of profitability but also of CSI value.

Management researchers have also increasingly focused on the importance of social innovation as a good investment for firms because it allows access to new markets and offers business opportunities in social and environmental areas (Herrera, 2016a). However, investing in CSI depends on many other firm-specific factors, such as organization, size, corporate and competitive strategy, corporate governance, and so on.

The main objective of this paper is to analyze important aspects of CSI: its definition and measurement, and the investment of firms' resources (mainly firm performance) in CSI. First, related to the definition given above, we collected the main traditional and current definitions of the concept. In terms of measurement, some international public organizations and many management researchers are working on a measure of CSI. We aim to contribute to this endeavor by proposing a measure of CSI based on its impact on quality of life. This construct covers six aspects: education, health, income, technology, environment, and firms' innovative effort. The measure aims to reflect the innovation-related contributions firms make to society.

Second, we examine the investment in CSI in some depth. In doing so, we propose several arguments to reduce a firm's fear to invest in CSI. The new business

innovation models collect internal and external stakeholders' social demands while also providing a better connection with non-profit agents that sometimes enables generating a profitability market. In this sense, we try to answer the following question: Are firms investing their financial resources in CSI? In spite of the popularity of social innovation, recent studies show that only theoretical analyses attempt to answer this question.

Moreover, these findings, sometimes supported by case studies, only propose a general overview of social innovation and their mechanisms, but there is no consensus about that issue. We try to contribute to previous literature by offering a definition, measure and empirical analysis that contribute to starting an academic debate about the measure of social innovation and in particular about the measure of corporate social innovation.

The rest of the paper is structured as follows. First, we introduce the conceptual framework for CSI. We then aim to define and, particularly, to measure CSI. We also present the theoretical relationship between corporate financial performance and CSI. In the third section, we describe the research methodology. The results of the data analysis are presented in section 4. Lastly, we present the main conclusions and limitations of this paper and some implications of the study.

## **2. Theoretical framework**

### **2.1. Corporate Social Innovation**

Despite the popularity of the social innovation concept and the proliferation of definitions (Cajaiba-Santana, 2014; Dawson & Daniel, 2010; Neumeier, 2012), there is still much confusion about social innovation. In order to clarify the concept and to construct our definition of social innovation, we first reviewed and analyzed the literature and the definitions offered by leading scholars in the field (Table 1). Many scholars have studied this idea, stressing the novelty of this type of innovation and its advantages for society (Herrera, 2015; Husted & Allen, 2006). One of the most accepted

definition was proposed by Phills *et al.* (2008, p.1), which defines social innovation as “*A novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions and for which the value created accrues primarily to society as a whole rather than private individuals*”.

-----Insert Table 1 about here-----

Over the years, social innovation has been widely discussed from various approaches: economic (Mulgan *et al.*, 2007), organizational (Phills *et al.*, 2008; Segarra-Oña *et al.*, 2017), and socio-ecological (Rennings & Rammer, 2011; Westley & Antadze, 2010). It has also become a key element for analyzing processes of territorial governance and an instrument for promoting country development (Andrew & Klein, 2010; Citroni, 2015; Edwards-Schachter *et al.*, 2012; Moulaert *et al.*, 2005).

Governments and public organizations such as the OECD, European Commission, World Bank, World Economic Forum and UNDP (United Nations Development Program) highlight the relevance of social innovation and its impact on living standards, and so invest extensive resources in promoting it. These agents are working on a measure of social innovation and also combine these efforts with academic advice in this field. After an extended review of the theoretical (Table 1) and empirical (Table 2) literature of social innovation, we discovered that these studies cover specific firms or sectors, and, in most cases, that it is not possible to extrapolate to other environments.

-----Insert Table 2 about here-----

Based on the final, public purpose of social innovation, most authors focus on the role of civil organizations (NGOs, foundations, etc.) and public agents as the main boosters of social change and therefore of social innovation (Citroni, 2015). However, firms are essential agents during this process. They usually allocate extensive resources to R&D, collaborate with internal and external agents around the world, create

fundamental knowledge and transform organizations and societies. They also seek to address significant social, economic, and environmental problems. Previous authors have shown how firms have developed innovations for underserved markets (Weiser, 2006), creating value in BoP (Bottom of Pyramid) markets, which can then be transferred to the developed world (Prahalad & Ramaswamy, 2004).

In this paper, we define CSI as the innovations developed by companies that contribute in new technological, environmental, and social ways to improving quality of life for society while also generating sustainable economic benefits. Many firms have shown that CSI amounts to an opportunity to adapt to the new reality while also meeting the demands of stakeholders. The benefits of investment in CSI have been widely reported; through CSI, a firm can meet the needs of the various stakeholders (Herrera, 2015, 2016a, 2016b), respond faster to environmental challenges (Moulaert *et al.*, 2005) and manage internal problems more efficiently (van der Have & Rubalcaba, 2016).

## **2.2. Financial performance and Corporate Social Innovation**

Previous literature has analyzed the profitability of CSR investment (Danilovic *et al.*, 2015; Margolis & Walsh, 2003; Orlitzky *et al.*, 2003; see Wang *et al.*, 2016, for a review). It has also studied the influence of innovation on firm performance in various contexts, firms, industries and regions, as well as from different perspectives and over different periods (see Cohen, 2010, for a review). Thus, we aim to perform our analysis in the opposite direction, focusing on the role of firms as the main investors in CSI, as agents that contribute to improved living standards and country sustainability (see Herrera, 2015, for a review). We do not study the profitability of investments in innovation, which has been widely analyzed in previous studies.

The rise of the “non-economic” field has become key in business management and, therefore, in the management of innovation (Christiansen & Buen, 2002; Preuss,

2007; Roth, 2009). Several studies have shown a trend toward combining social and corporate financial objectives (André *et al.*, 2017; Carroll & Shabana, 2010; Porter & Kramer, 2011; van Beurden & Gossling, 2008). Rao-Nicholson *et al.* (2017) acknowledge that the primary purpose of organizations is not social, but they are also engaged in addressing societal problems through social innovation. As stated above, firms today play a fundamental role as agents of social change, allocating extensive resources to innovation and boosting CSI (Rao-Nicholson *et al.*, 2017).

As argued by Cajaiba-Santana (2014) and Van der Have and Rubalcaba (2016), social innovation can be understood as new social practices created collectively to prompt social change. According to these authors, who focus on the individualistic agency perspective, firms are one of the main individual agents that contribute to the generation of social value through social innovations. Along the same lines, other authors focus on the role of firms' innovation culture in linking economic and social responsibilities with financial performance (Cegarra-Navarro *et al.*, 2016; Mirvis *et al.*, 2016; van der Have & Rubalcaba, 2016).

Each year, firms invest more resources in CSI for the following reasons. First, *firms as a reference in markets*; in this way, firms that make large investments in innovation, especially in CSI, are more visible and are usually subject to greater pressure from society to show their social commitment (Aragón-Correa, 1998; Sharma, 2000). In such cases, the pressure exerted by stakeholders will determine the form and success of the organization (DiMaggio, 1988). In some cases, in order to maintain their position in the market, they are forced to invest greater resources in education, health, social development, technological advancements, and environmental improvements in an innovative way. Second, *CSI as a nexus between profit and non-profit agents*; investments in CSI allow firms to obtain more information about NGOs' problems,

products, services, and the technology used (Mirvis et al. 2016) locally and especially in foreign countries, facilitate business practices with local banks and public organizations, and reinforce and create new alliances and collaboration in this social area (see To, 2016, for a review). Third, *CSI as a response of new business models*; most firms invest greater resources in CSI in order to adapt their business model to market demands (Geissdoerfer et al. 2018; Schaltegger et al. 2012). All internal and external stakeholders demand new business models that address their problems in a different way (Lozano, 2013; Turker & Altuntas, 2017). Business models in the energy sector are especially sensitive to CSI investments (see Hiteva & Sovacool, 2017, for a review). CSI allows one to answer these demands and at the same time increases firms' efficiency and productivity. For all these reasons, we propose hypothesis 1:

*H1: Financial Performance has a positive effect on Corporate Social Innovation*

### **3. Methodology**

#### **3.1. Data sources and description of the sample**

The data used in this study come mainly from the EU Industrial R&D Investment Scoreboard developed by the Institute for Prospective Technological Studies (IPTS), which belongs to the European Commission's Joint Research Centre. This database gathers information on the 1,000 European and 1,000 non-European industrial firms that invested most in R&D every year from 2005 to 2011.

Additional data include Main Science Technology Indicators and National Accounts Statistics from the OECD and the World Bank's World Development Indicators, all for the period 2005-2011. The final sample included 1,122 firms from 29 countries (European and non-European), with a total of 5,255 observations.



Table 3 shows the breakdown of the sample for each of the countries included in the final analysis, with the number of observations for each country as well as the main descriptive statistics.

-----Insert Table 3 about here-----

### **3.2. Measurement of the variables**

The hypothesis describes the influence of corporate financial performance on CSI. In particular, we try to analyze the availability of funds for investment in CSI. Moreover, we aim to contribute empirically to the literature by creating a measure of CSI.

#### *3.2.1. Dependent variable*

CSI is the dependent variable in this study, for which we propose a new measure based on the arguments in the prior literature (Table 2). One of the first authors to quantify social innovation in an economic analysis was sociologist Gershuny (1983), who asserts that processes of social innovation have a direct economic effect; therefore, he proposes a measure based on GDP. Leadbeater (1997) places special emphasis on the role of social entrepreneurs and suggests a measure in line with this notion (Metcalf, 2006). Phills *et al.* (2008) propose a possible measure of social innovation based on quantification of Corporate Social Responsibility or Socially Responsible Investment. However, these authors only suggest a theoretical measure of this concept; they do not test it empirically. Recently, other authors have recommended different measures applied to small firm samples, based on secondary sources (Cegarra-Navarro *et al.*, 2016). But such measures cannot be extrapolated to other contexts because of the endogeneity problems that they mention: the analysis is cross-sectional, they do not know who filled in each questionnaire, and they analyze a specific region. The present study, however, does propose an initial starting-point for measuring CSI. We construct

our index based on this and other recent studies about the theoretical measure of CSI (Herrera, 2016a; Meissner *et al.*, 2017; Mirvis *et al.*, 2016; van der Have & Rubalcaba, 2016; Segarra-Oña *et al.*, 2018). All these authors agree that CSI contributes to improved quality of life in terms of social and physical wellbeing (Cajaiba-Santana, 2014; Edwards-Schachter *et al.*, 2012). More recently, theoretical studies have described how companies engage in CSI (Mirvis *et al.*, 2016) and shown how innovation models have been applied to health care, education and community economic development (Christensen *et al.*, 2006). Moreover, international institutions such as the European Union, OECD, INSEAD, World Economic Forum, UNDP, and others indicate that social innovation can be measured by the rate of employment, innovation efforts, educational level, degree of social integration, and level of pollution. Given the inherent complexities of social innovation as an emerging subject of study, we have tried to bring all of these arguments together in a single equation in order to measure CSI. We consider that a country's wellbeing depends on three principal agents – public agents, private agents, and society – each of which encompasses other groups of agents. In particular, we are interested in the influence of private agents. The main instrument that firms have in order to change society is investment in innovation, but the capacity of a single firm to change society through innovation is limited. We considered the 1,000 most important firms in the world by year, in terms of innovation investment. As the European Commission argues, these firms accounted for at least 90% of countries' innovation investment. We therefore focus our analysis on the influence of firms in terms of innovation on their country's wellbeing.

In order to evaluate this impact, and based on recommendations proposed in previous studies (Cajaiba-Santana, 2014; Cegarra-Navarro *et al.*, 2016; Edwards-Schachter *et al.*, 2012; Herrera, 2016a, 2016b; Mirvis *et al.*, 2016), we construct a ratio

to evaluate which part of the country’s wellbeing is represented by firm innovation. Our index is also consistent with the specifications collected by GRI (Global Reporting Initiatives). Specifically, in the numerator of the equation, we found firms’ innovative efforts, measured as expenditure on R&D by firms in a specific year over their sales during the same period. This measure is widely accepted and has been used in previous research (Cincera & Veugelers, 2014; García-Manjón & Romero-Merino, 2012). Second, in the denominator, we have an index of the country’s wellbeing formed by five groups of variables: education, health, income, environmental and technological conditions (see Table 4 for measures). We construct a “Society Wellbeing Index” (SWI) based on the methodology used in the Human Development Index (HDI) devised by UNDP. The SWI measures the country’s wellbeing by considering social factors as well as technological and environmental factors. Lastly, we construct the following ratio to measure CSI:

$$Corporate\ Social\ Innovation\ Index_{it} = \frac{\frac{R\&D\ Investment_{it}}{Sales_{it}}}{SWI_t}$$

-----Insert Table 4 about here-----

### 3.2.2. *Independent Variable*

Financial Performance (Performance). The corporate financial performance variable is measured as a profitability ratio. We base it on operating profit, calculated as profit (or losses) before tax, plus the net cost of interest (or minus the broker’s margin), minus any government subsidies, minus any revenue (or more losses) from the sale of firms or fixed assets. The data were obtained from the EU Industrial R&D Investment Scoreboard for the period 2005-2011. In order to evaluate the time effect of availability

of funds to reinvest in CSI, we considered performance from three different periods (performance<sub>t</sub>, performance<sub>t-1</sub> and performance<sub>t-2</sub>).

### 3.2.3. *Control variables*

In order to increase the robustness of the model and properly analyze the effect of corporate financial performance on CSI, we use variables that represent the three groups considered. This model includes five control variables, namely, one firm variable, two referring to public activity and two for society:

Firm size (SIZE). Firm size is measured in this study as the natural logarithm of the number of employees working in the firm during the year of reference. We use this logarithm because it reduces variable dispersion, and its interpretation is close to elasticity. The data were obtained from the EU Industrial R&D Investment Scoreboard for the period 2005-2011.

Transparency of government policy (Transparency). This variable measures state efficiency in terms of government transparency in an index between 0 and 10, from poor to satisfactory. The data were obtained from the World Competitiveness Index drawn up by the World Economic Forum for the period 2005-2011.

Risk of Political Instability (Risk). This variable measures state efficiency in terms of risk of political instability in an index between 0 and 10, from high to low risk of instability. The data were obtained from the World Competitiveness Index drawn up by the World Economic Forum for the period 2005-2011.

Social Cohesion (Socialco). This variable measures the societal framework in terms of social cohesion in an index between 0 and 10, from not a priority to a priority. The data were obtained from the World Competitiveness Index drawn up by the World Economic Forum for the period 2005-2011.

Civil Society Organizations (Civilorg). This variable measures the number of civil society organizations created by country and year. In particular, we considered disability, development and rights organizations, foundations and non-governmental organizations. The data were obtained from the ECOSOC database (Economic and Social Council) drawn up by United Nations for the period 2005-2011.

Annual cycle variables. Because the observations refer to different time periods, any macroeconomic effects on innovation in each of the periods should be taken into account. For this purpose, six time dummies were created (one for each year of the period except 2011, to avoid multicollinearity).

Table 5 covers the main descriptive statistics (mean, standard deviation, minimum and maximum) for the dependent variable (CSI) and for each of the variables used in the study (independent and control variables).

-----Insert Table 5 about here-----

### **3.3. Specification of the model**

To test the hypothesis, we built a Dynamic Linear Model for estimation based on panel data analysis. Due to the possibility of endogeneity between the dependent variable (CSI) and the independent and control variables (Performance and Size) used in the model, it is necessary to use the Generalized Method of Moments (GMM) developed by Arellano and Bond (1991). This methodology aims to resolve any relevant econometric problems in the study, such as the presence of unobservable individual effects or endogeneity.

The consistency of the GMM estimator depends on the validity of the instruments. Three specification tests suggested by Arellano and Bond (1991) were used. The first is the Hansen over-identification test, which tests the absence of correlation between the instruments and the error term, i.e., the joint validity of the

instruments used. The second test examines the hypothesis of the absence of second-order serial autocorrelation AR(2) in the first-difference residual (m2) and the hypothesis of absence of first-order correlation AR(1) (m1). Third, we performed the Wald joint significance test on the explanatory variables (Z1) and the fictitious time variables (Z2).

A variance inflation factor (VIF) analysis was performed before estimating the proposed model to detect any problems of multicollinearity. In no case was the VIF greater than 10; therefore, according to the empirical rule of Kleibbaum *et al.* (1998), no multicollinearity problems were present.

#### 4. Results

Three analyses were performed to test the hypothesis, taking into account the dependent variable (CSI) (Table 6). The analyses of the data panel were performed using STATA 10.0. As stated above, the estimation method uses a series of instruments and lags on the variables to solve the problem of endogeneity in the variables used. Moreover, Table 6 shows the coefficient and Z test for each of the variables used in the model, based on estimation by the GMM (Generalized Method of Moments). Table 6 also shows the aforementioned specification tests.

-----Insert Table 6 about here-----

In the first model, we introduce financial performance<sub>t</sub> as the only explanatory variable along with the control variables (size, transparency, risk, socialco, civilorg and annual cycle variables). As shown in Table 6, the model can be considered valid according to the individual and joint specification tests. The coefficient for the independent variable was negative and statistically significant at the 1% level, contrary to hypothesis 1 (Table 6). However, there are some explanations for this negative relationship between financial performance<sub>t</sub> and CSI in the same year. First, the funds

available for reinvestment in CSI could be not used in the same period; in addition, high investment in CSI might negatively affect profits in the same period. Second, CEO opportunism may influence investment in CSI if CEOs pursue their personal short-term interests rather than those of the firm (Jensen, 2002).

In the second model, we introduce another independent variable (financial performance<sub>t-1</sub>). In this case, we also try to test our hypothesis 1 about reinvestment in CSI but taking into account a delay of one year. We therefore analyze the influence of two independent variables (Financial Performance<sub>t</sub> and Financial Performance<sub>t-1</sub>) and five control variables (size, transparency, risk, socialco and civilorg) and annual cycle variables on CSI. As shown in Table 6, the model can be considered valid according to the individual and joint specification tests. The coefficient of financial performance<sub>t</sub> was negative (similarly to Model 1) and statistically significant at the 1% level, as shown previously (Table 6). Moreover, in this model, we can confirm hypothesis 1 about the positive influence of financial performance<sub>t-1</sub> on CSI. Thus, according to these results, we show that firms' profit would negatively affect CSI in the same year; additionally, we find a positive influence between financial performance<sub>t-1</sub> and CSI. We therefore understand that firms will use the profit from one year to invest in CSI the following year. In this case, CEO opportunism disappears or at least decreases, and the theory of funds available becomes significant. Previous studies arrive at similar conclusions for the relationship between Corporate Social Performance and financial performance (see Orlitzky *et al.*, 2003, for a review).

In the third model (Model 3), we include all the independent variables (financial performance<sub>t</sub>, financial performance<sub>t-1</sub>, and financial performance<sub>t-2</sub>) and the same control variables. We also confirm the negative influence of financial performance<sub>t</sub>, and the positive influence of financial performance<sub>t-1</sub> on CSI, but we cannot confirm the

influence of financial performance<sub>t-2</sub>. As shown in Table 6, the model can be considered valid according to the individual and joint specification tests. According to these results, we argue that funds available in one period might have an influence on the next period, but we cannot confirm their influence two years later. The influence of financial performance<sub>t-2</sub> on CSI is probably slight; hence, it is not significant.

Lastly, as shown in Table 6, we find a positive and significant relationship between control variables (risk and socialco) and CSI in the three models. It seems obvious that the level of country risk and instability might negatively affect investment, particularly in CSI. On the other hand, a good level of social cohesion helps make the most of firms' investment, especially when such investments might affect living standards. Moreover, in the first model, we also found another significant control variable (civilorg). As many authors show, civil organizations are essential to increasing a society's living standards and helping improve quality of life. Such organizations exert a major influence on developed and developing countries. They may help firms introduce products and services in many countries and also to gain access to new markets. In addition, we also found a significant effect of the "transparency" variable on CSI in models one and two. Countries with a high level of transparency create a favorable environment for social innovation investment. We did not find a significant relationship between firm size and CSI. This effect could possibly be found for other variables included in the model.

## **5. Conclusions**

The main contribution of this research is to shed some light on Corporate Social Innovation. For many years, scholars have documented the existence, the process and the beneficial outcomes of social innovation (Cajaiba-Santana, 2014; Igarashi & Okada, 2015; Neumeier, 2012; Segarra-Oña et al., 2017). Over the last decade, interest has



increased sharply in the concept of social innovation, and many papers also stress the role of public organizations in supporting it (Adams & Hess, 2010; Howaldt & Schwarz, 2010; Moulaert *et al.*, 2005). More recently, studies have highlighted the relevance of the tertiary sector and the role of NGOs in generating social value (Felício *et al.*, 2013). However, the capacity of NGOs and public organizations remains limited, and sometimes their actions may be considered charity. In other cases, NGOs integrate CSI as a fundamental part of their organizations, what the literature calls “hybrid organizations.” Alignment of strategy with the business context, both the market and beyond it, helps institutionalize social innovation (Herrera, 2015). For these reasons, scholars from different areas show that it is important for firms to generate CSI (Herrera, 2015; Mirvis *et al.*, 2016). They point to the capacity of firms to produce new social innovations. In addition, the new business sustainability innovation models include CSI as a part of the model, integrating social and environmental issues (Johnson, 2015), increasing and strengthening connections between internal and external stakeholders’ demands, coordinating the objectives of profit and non-profit agents, and improving their efficiency (Geissdoerfer *et al.*, 2018; Hiteva & Sovacool, 2017; Schaltegger *et al.*, 2012). The advisability of increasing firm investment in CSI, as proved in this paper, is also supported by the relevant growth of sustainability business innovation models (Pedersen *et al.*, 2018; Ritala *et al.*, 2018). Although the awareness and convenience of CSI implementation is clear, it is necessary to analyze which level of investment in CSI is necessary, how and to what extent CSI should be integrated into the main model of the firm, the applicability of these sustainability business models for all the firms, independently of the sector and country considered, and the role of internal and external stakeholders’ engagement in this CSI integration.

All of these arguments open a new line of inquiry in this field of knowledge and contribute to the debate in the current literature.

Research on social innovation has been criticized for being fragmented. The concept itself is too ambiguous, and many definitions of social innovation have been put forward (van der Have & Rubalcaba, 2016). These conditions do not favor the consolidation of social innovation in firms and societies. Several papers (Alsudairi & Tatapudi, 2014; Herrera, 2015; Tracey & Stott, 2017) analyze the concept of social innovation theoretically, but their notions are too vague (Mirvis *et al.*, 2016). To promote a clearer and more complete understanding of the emerging CSI concept and to help build up knowledge about social innovation, we summarize the most representative definitions. Additionally, we propose a measure of CSI based on previous studies (Cegarra-Navarro *et al.*, 2016; Herrera, 2016a, 2016b; Segarra-Oña *et al.*, 2017) and in line with the recommendations made by public organizations (OECD, 2016; United Nations Development Programme (UNDP), 2016). Firms that invest in social innovation display socially acceptable behavior and serve as an example for other firms wishing to enhance their reputation. As stated in the previous literature, the greater visibility of such firms means that they will be subject to greater pressure from different stakeholders to exhibit their social commitment (Aragón-Correa, 1998; DiMaggio, 1988; Sharma, 2000); as a result, they may feel forced to improve society and generate CSI.

## **6. Implications and future lines of research**

This research has implications for researchers, managers, companies, NGOs, public organizations and societies with an interest in understanding social innovation. First, for researchers, we propose a definition, a measure and an empirical study on CSI. Thus,

we lay the groundwork for continued research on CSI, especially in quantitative terms. Although this paper has many theoretical implications for researchers, its most relevant implications are for firms, NGOs and governments. We analyze the behavior of the most important firms around the world in terms of R&D, which can serve as a guide for other firms and for managers. We propose that firms should bear in mind that certain commercial products and services may also lead to developments in CSI which, in turn, may create economic benefits for themselves and for society. Firms should try to adapt to their stakeholders' demands in order to improve their efficiency.

Second, NGOs should bear in mind the relevance of social innovation for solving social problems and may consider that firms have a role to play in developing it. Most NGOs share the same social objectives, but firms can develop them more efficiently and more innovatively. In this sense, alliances created among these agents could be a good strategy for all of them and may increase social wellbeing and generate profits. Third, this paper could be of interest to governments because they usually support CSI. At the outset, firms prefer to invest their scant resources in other innovations that focus more on profitability, and so sometimes they need a boost to start investing in CSI. Policymakers should bear in mind the influence of this type of innovation on society. On the other hand, some institutional drivers help create a virtuous cycle effect on the process of social innovation.

In our empirical analysis, we also consider the influence of transparency, risk and social cohesion. According to our results, governments should encourage transparency and reduce the instability associated with their political and public organizations. Moreover, this paper highlights the relevance of social cohesion among citizens, which helps build a good environment to create and improve social innovations, resulting in greater social value. Lastly, this paper has implications for

society because most innovations aim to benefit society. Today's societies see firms as a model for social change that is completely integrated in society, rather than as an individual agent. They form an essential part of the workings of CSI. Companies are aware of this, and more and more citizens now participate in social innovations.

It is important to stress some caveats to our empirical findings. We have already noted some limitations of our measure. A further limitation is that it combines two different levels of analysis. This is risky because it is difficult to combine all aspects of CSI in the same measure. Another important limitation is that we do not know how much is really invested in CSI. We know how much is spent on R&D, but not the specific amount allocated to social innovation. However, as many other papers show, most R&D investment helps increase living standards and generates social value.

Moreover, the scant literature hampers a comparison of our analysis with previous research in this field. In this sense, we lay the groundwork for a new field of research on CSI, especially focusing on the measure. Clearly, additional information on firms' internal factors would allow for greater knowledge about CSI and the development of more appropriate strategies to achieve it. Future research should complement the present study with case studies of firms that contribute to social innovation.

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**Table 1. Social Innovation definitions**

Year	Author	Journal	Definition
1983	Gershuny, J.	Oxford University Press	Social innovation is used to describe the process whereby the modal split changes over time
2002	Mumford, M.D.	Creativity Research Journal	The generation and implementation of new ideas of how people should organize interpersonal activities, or social interactions, to meet one or more common goals
2005	Gerometta, J.	Urban Studies	The satisfaction of human needs; changes in social relations especially with regard to governance; and an increase in the socio-political capability and access to resources
2007	Mulgan, G.	Innovations	Innovative activities and services that are motivated by the goal of meeting a social need and that are predominantly developed and diffused through organizations whose primary purposes are social
2008	Phills, J.A. et al.	Stanford Social Innovation Review	Novel solution to a social problem that is more effective, efficient, sustainable, or just than existing solutions, and for which the value created accrues primarily to society as a whole rather than private individuals
2009	Pol, E., and Ville, S.	Journal of Socio-Economics	Implied a new idea that has the potential to improve either the quality or the quantity of life
2010	Howaldt, J., & Schwarz, M.	Fokus	A new combination and/or a new configuration of social practices in certain areas of action or social contexts prompted by certain actors or constellations of actors in an intentional targeted manner with the goal of better satisfying or answering needs and problems than is possible on the basis of established practices
2010	Dawson, P., & Daniel, L.	International Journal of Technology Management	The development of new concepts, strategies and tools that support groups in achieving the objective of improved well-being
2010	Murray, R. et al.	NESTA and Young Foundation, UK	The development and implementation of new products, services or models to meet social needs and create new social relationships
2010	Westley, F. & Antadze, N.	The Innovation Journal: The Public Sector Innovation Journal	A complex process of introducing new products, processes or programs that profoundly change the basic routines, resource and authority flows, or beliefs of the social system in which the innovation occurs
2010	Adams, D. & Hess, M.	The Economic and Labour Relations Review	The capacity to create and implement new ideas that are likely to deliver societal value
2012	TEPSIE		Social innovations are new solutions (products, services, models, markets, processes, etc.) that simultaneously meet a social need (more effectively than existing solutions) and lead to new or improved capabilities and relationships and a better use of assets and resources
2012	Neumeier, S.	Sociologia Ruralis	Changes in attitudes, behaviors or perceptions of a group of people joined in a network of aligned interests that in relation to the group's horizon of experiences lead to new and improved ways of collaborative action within the group and beyond
2012	Nicholls, A. & Murdock, A.	Palgrave Macmillan	The production of new ideas and new structures and a process of recontextualization within socially (re)constructed norms of the public good, justice and equity
2012	Edwards-Schachter, M. et al.	Review of Policy Research	Is seen as providing new solutions and instruments to cope with the economic crisis and other global dilemmas such as climate change, energy and resource scarcity, health and demographic imbalances, which are becoming more urgent and require rapid resolutions
2013	Moulaert, F. et al.	Collective Action, Social Learning and Transdisciplinary Research	Innovation in social relations, not only particular actions but also the outcome of actions that lead to improvements in social relations, structures of governance, greater collective empowerment, and so on
2014	Cajaiba-	Technological	New social practices created from collective, intentional, and goal-

	Santana, G.	Forecasting and Social Change	oriented actions aimed at prompting social change through the reconfiguration of how social goals are accomplished
2014	Manzini, E.	Design Issues	A new idea that works in meeting social goals
2015	Phillips, W. et al.	Group & Organization Management	A social value creation through combining social impact and sustainability with profitability
2015	Herrera, M.E.B	Journal of Business Research	Social innovation is a measurable, replicable initiative that uses a new concept or a new application of an existing concept to create shareholder and social value. Identifying drivers, enablers, and barriers to idea generation, experimentation, and implementation is critical to understanding Corporate Social Innovation institutionalization
2015	Voorberg, W. & Bekkers, V.	Public Management Review	Social innovation is an inspiring concept because it stimulates people, politicians and policy makers to explore and implement new ideas about the way a society deals with a number of challenges
2015	Choi, N. & Majumdar, S.	Technology and Innovation for Social Change. Springer	Social innovations comprise three dimensions: (1) formalization, (2) change processes, and (3) social outcomes
2015	Igarashi, Y. & Okada, M.	Technological Forecasting and Social Change	A new strategy that implies innovative activities and services that are motivated by the goal of meeting a social need while aiming to maximize profits
2016	Tracey, P.J. & Stott, N.	Innovation, Organization & Management	A broad range of organizational and interorganizational activity that is ostensibly designed to address the most deep-rooted 'problems' of society, such as poverty, inequality and environmental degradation
2016	Windrum, P. et al.	European Journal of Innovation Management	The development of new or improved services for society
2016	Van der Have, R.P. & Rubalcaba, L.	Research Policy	Novel social 'practices' that focus on 'processes of change' or an 'idea', 'service' or 'new systemic' transformations and outcomes
2016	Mirvis, P. et al.	Journal of Business Research	A strategic investment that allows one to engage a company in societally relevant R&D and applies the full range of corporate assets to the challenges at hand and involves deeper collaboration across functions within a firm and with external parties to co-create something new that provides a sustainable solution to social ills
2017	Avelino, F. et al.	Technological Forecasting and Social Change	Change in social relations, involving new ways of doing, organizing, knowing and framing
2017	Turker, D. & Altuntas Vural, C.	Technological Forecasting and Social Change	A significant change in social structures that improves the economic and social performances of these structures, which comprise public goods and services, a regulatory framework, and organizational principles
2018	Van Wijk, J. et al.	Business & Society	Describes the agentic, relational, situated and multilevel process to develop, promote and implement novel solutions to social problems in ways that are directed toward producing profound change in institutional contexts
2018	European Union		An innovation that is social in its ends and in its means, thereby embracing new ideas that meet social needs by creating new social relationships and collaborations

**Table 2. Measure of Social Innovation**

Year	Author	Journal	Measure
1983	Gershuny, J.	Oxford University Press	Measure based on GDP
1997	Leadbeater, C.	DEMOS	Measures that quantify the level of social entrepreneurship, total number of social entrepreneurs, total investments, outcomes
2006	Christensen, C.M. et al	Harvard Business Review	Total investment in innovations in these aspects: Health Care, Education, and Economic Development
2008	Phills, J.A. et al.	Stanford Social Innovation Review	Measure of social innovation based on quantification of Corporate Social Responsibility or Socially Responsible Investment
2016	Cegarra-Navarro, J.G. et al.	European Management Journal	Measure based on a Likert Scale (1-5) for CSR and innovation. 26 items: 20 items focus on social and economic responsibilities at the regional level and 6 items on innovation based on OCDE (2005)
2015	Herrera, M.E.B.	Journal of Business Research	Social innovation is based on two components: process variables (stakeholder engagement and formalization of solution) and leader variables (formal authority, formal influence and personal experience)
2016	Mirvis, P. et al.	Journal of Business Research	Strategic investments that engage a company in societally relevant R&D and apply the full range of corporate assets to the challenges
2016	Van der Have, R.P. & Rubalcaba, L.	Research Policy	Measure based on the innovations generated by organizations that can create positive value by improving welfare for societies and nations. Authors highlight “novel social technologies that create new social value”
2017	Meissner, D. et al.	Journal of Technology Transfer	Measure based on R&D and innovation investment that contribute to dealing with societal challenges (sustainability of modern industrialized societies, mobility, demographic shifts and the aging population, security as well as health and wellbeing)
2018	Segarra-Oña et al. 2018	Corporate Social Responsibility and Environmental Management	Social innovation construct is built on six pillars: health, safety, employment, sustainability, growth, and environmental concerns
2018	European Commission		A measure based on two indicators: Micro-level measurement (how successfully a social enterprise is contributing to this goal) Macro-level measurement (GDP and progress on GDP)
2018	OECD		Better Life Index. Compute 11 topics dealing with living conditions and quality of life; housing, jobs, work-life balance, income, health, safety, education, community, civic engagement, environment and life satisfaction
2018	INSEAD		Measure based on the scalability and replicability, level of innovation, inspiration and sustainability projects
2018	World Economic Forum		Measure based on social and environmental impact of innovations. This organization suggest a questionnaire based on the Pearson scale
2018	UNDP		This organization provides a Human Development Index, a summary measure of average achievement in key dimensions of human development: health, education and income

**Table 3. Descriptive statistics by country for the dependent variable (social innovation)**

<b>Country</b>	<b>Observations</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Australia	17	8.51	3.64	4.17	14.87
Austria	94	11.50	35.38	0.06	261.72
Belgium	108	6.26	7.14	0.12	30.21
Brazil	18	3.01	1.79	1.03	6.97
Canada	22	6.68	6.26	0.80	16.30
China	35	7.36	7.50	0.29	22.09
Denmark	129	15.09	34.00	0.17	212.64
Finland	212	11.97	42.76	0.27	464.25
France	390	41.47	298.61	0.19	4518.09
Germany	613	11.47	39.97	0.03	588.94
Greece	5	2.51	0.99	1.46	3.73
Hungary	12	10.57	1.11	8.40	11.93
India	16	8.68	6.91	1.45	24.89
Ireland	50	7.40	12.66	0.46	48.04
Israel	24	11.47	4.84	6.46	21.09
Italy	140	5.63	5.21	0.08	22.87
Japan	1046	5.10	4.95	0.33	36.96
Luxembourg	16	0.72	0.28	0.26	1.03
Norway	23	1.58	1.64	0.32	5.04
Poland	5	0.46	0.07	0.41	0.55
Russia	6	0.89	0.20	0.73	1.23
Slovenia	6	9.73	0.73	8.52	10.42
Spain	79	8.09	14.42	0.11	69.58
Sweden	244	14.35	48.43	0.04	509.18
Switzerland	153	7.01	7.13	0.36	28.90
The Netherlands	26	7.04	6.78	0.14	31.96
Turkey	6	0.65	0.27	0.20	0.85
United Kingdom	680	22.94	108.94	0.02	2039.03
United States	1079	26.92	167.06	0.1	3561.17
Total	5255	18.06	127.73	0.02	4518.09



**Table 4. Society Wellbeing Index (SWI)**

<b>Variable</b>	<b>Measure</b>
Education	School registration, secondary level (gross %).
Health	Life expectancy at birth, total (years)
GDP	GDP per capita
Environment	CO <sub>2</sub> emissions (tons per capita)
Technology	<ul style="list-style-type: none"><li>- Exports of high-technology products (% of exports of manufactured goods)</li><li>- Broadband Internet subscribers (per 100 people)</li></ul>

**Table 5. Descriptive statistics for the independent, dependent, and control variables**

<b>Variable</b>	<b>Observations</b>	<b>Mean</b>	<b>Standard deviation</b>	<b>Minimum</b>	<b>Maximum</b>
Social Innovation	5255	18.06	127.73	0.02	4518.09
Performancet	5255	-345.64	24745.82	-1794500	210.41
Performancet-1	5255	-5.66	176.49	-5539.32	210.70
Performancet-2	5255	-8.23	234.19	-10400	201.42
Size	5255	9.10	1.72	3.33	13.22
Transparency	5255	4.88	1.16	1.94	8.11
Risk	5255	7.79	1.44	2.79	9.90
Social Cohesion	5255	5.99	0.89	3.42	8.64
Civil organizations	5255	7.95	6.26	0	25

**Table 6. Main results**

<b>Variables</b>	<b>Model 1</b>	<b>Model 2</b>	<b>Model 3</b>
Performance	-0.74*** (-6.97)	-0.74*** (-7.77)	-0.74*** (-10.43)
Performance <sub>t-1</sub>		0.08** (2.21)	0.09** (2.05)
Performance <sub>t-2</sub>			-0.01 (-0.64)
Size	0.21 (0.10)	-0.32 (-0.16)	0.10 (0.05)
Transparency	1.02 (1.72)	1.28 (1.85)	1.07 (1.37)
Risk	-2.06** (-2.37)	-2.39 (-2.75)	-2.15** (-2.18)
Socialco	1.59*** (1.75)	1.77*** (3.10)	1.81*** (3.07)
Civilorg	0.15* (1.67)	0.14* (1.59)	0.12 (11.47)
Annual dummies	Yes	Yes	Yes
Wald test	76.49***	164.03***	304.26***
AR-1	-1.48	-1.54	-1.55
AR-2	-0.14	0.41	0.52
Hansen test	21.37 (18)	16.24 (18)	16.97 (18)
Z1	56.78***	121.99***	232.50***
Z2	19.71 ***	42.04***	71.76***

\*\*\* Significant at 0.01; \*\* significant at 0.05; \* significant at 0.1; standard errors are shown in brackets. AR(1) and

AR(2) are tests of the null hypothesis of no first- or second-order serial correlation, respectively. Hansen is a test of

the validity of the overidentifying restrictions based on the efficient two-step GMM estimator.