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Social Responsibility of Construction Company as Strategy for Sustainability in Island Territories

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Abstract

The increase in urbanization and the volume of construction has accelerated. This situation requires systematizing the use of limited resources, especially in island territories. The construction sector contributes to the depletion of these resources and has a significant impact on society, which is why it is necessary to change its strategy and decision-making. Corporate Social Responsibility (CSR) may be the strategy to develop a socio-environmentally responsible production model that replaces the traditional one. A socially responsible construction company optimizes use construction materials, gives value to waste generated, minimizes the impact that buildings have on the environment, makes responsible use of energy and water, uses innovations to improve the process and adequately manages its human resources. The aim of this work is to analyse the socially responsible behaviour of companies in the construction sector in a limited and fragmented territory as is the province of Santa Cruz de Tenerife and to compare the importance that companies give to their actions, using for the first time 99 indicators grouped into

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three factors: environmental, social and economic, thus also highlighting the contribution of CSR to sustainability. The companies surveyed indicate whether they have implemented or plan to implement them in the future. The results indicate that aspects related to environmental sensitivity and social contribution contribute most to the implementation of a CSR strategy, while economic aspects have a negative influence. In the case of companies planning to implement a CSR strategy in the future, the social contribution aspect is the most influential.

Keywords

Corporate Social Responsibility; Construction Sector; Sustainability; Quantitative Analysis

Introduction

Research on Corporate Social Responsibility (CSR) in the construction sector is relatively recent and markedly increased in the second decade of the 21st century (Loosemore, *et al.*, 2018). The analyses of the socially responsible behaviour of these companies provide data to assess the way in which they understand business management and its effects on the environment (Loosemore and Lim, 2017; United Nations, 2009; 2012). According to Watts, Dainty and Fernie (2015) and Zhang, Oo and Lim (2019), companies in the construction sector are increasingly concerned about the impact of their activity on society, and they do this motivated by environmental factors, and by factors related to finding ways to protect their legitimacy and image in line with social expectations. Daily practices are associated more with the environmental dimension than with the social dimension. Specifically, they undertake actions in the field of energy efficiency and management of construction and demolition waste from the projects they execute (Ogunmakinde, Egbelakin and Sher, 2022). Some companies publish their mission and vision statements, but do not comply with a formal CSR commitment (Lim and Loosemore, 2017). Agents in the construction sector are beginning to think that it is necessary to make commitments regarding social rights and environmental impacts (Domínguez-Herrera, 2017). Burón-Maestro (2007) understands that one way to promote the change towards a CSR strategy is to create CSR indices to assess the goodness of each constructive solution through an indicator of its sustainability (Opoku, 2019).

Given the importance of this sector in the development of communities and in the fulfillment of the sustainable development objectives, the objective of this work focuses on analysing the socially responsible behaviour of companies in the construction sector to verify what practices lead to carried out by these companies and the weight of their contribution to the economic, social and environmental dimensions.

Given the importance of this sector in the development of communities and in the fulfillment of the sustainable development objectives, the aim of this work is focused on analysing the socially responsible behaviour of companies in the construction sector to verify what practices carried out by these companies and the weight of their contribution to the economic, social and environmental dimensions, comparing the importance that companies place on CSR actions depending on whether they have been implemented or there are plans to implement them in the future. The second section then develops the theoretical framework focused on CSR and sustainability in the construction sector. The third section describes the hypotheses and the methodology used. The fourth section presents the quantitative results. Finally, the discussion and the conclusions of the study are summarized, as well as the limitations and future lines of work.

Theoretical framework: CSR and sustainability in the construction sector

After several decades of research, three questions related to CSR remain to be answered. The first is that there is no single definition, but in the context of this research the definition of the European Commission

(2001; 2011) is assumed because it is the most complete (Diagram 1), subsequently defining the strategy for the sustainable competitiveness of the construction sector and their companies (European Commission, 2012). The second issue is that the empirical relationship between company profitability and CSR has not been resolved. Zeng (2016) sees a direct correlation between the company's market value and the company's position in the CSR rankings, while Cherian, *et al.* (2019) suggest that certain CSR actions increase the value of the company more than others. The third issue concerns the debate on whether CSR should be voluntary or mandatory. In any case, there are reasons to be optimistic, since the trend in the business sector points towards more responsible behaviour, with the support of governments playing an important role in meeting the objectives (Abbas, 2020).

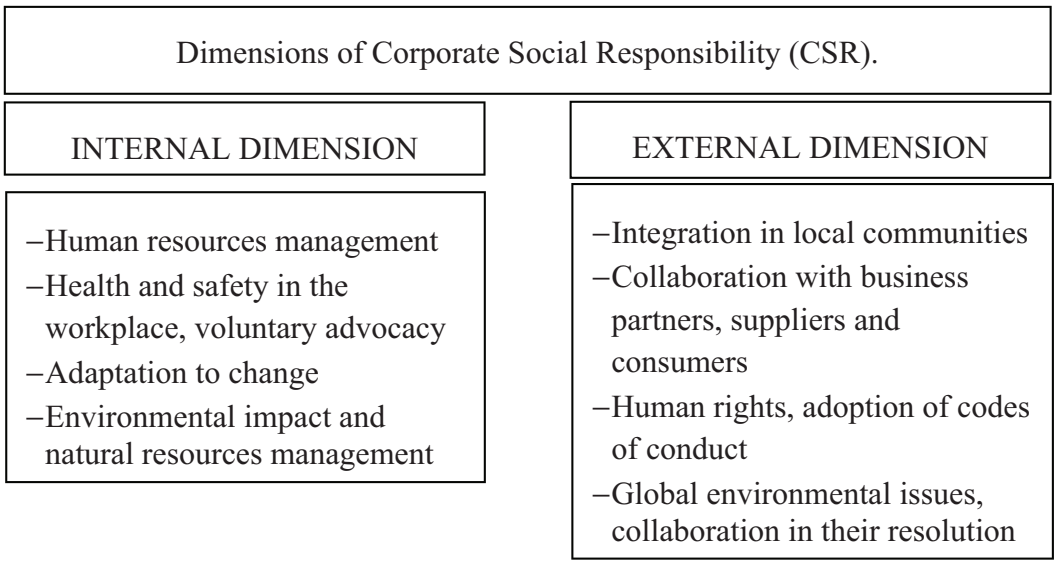

Diagram 1. Dimensions of Corporate Social Responsibility.
Source: González Morales (2008, p.97)

CSR is a strategic axis of business management which has a clear impact on decision-making, so it should not be exclusively assimilated as an ethical practice of companies (Aguinis and Glavas, 2012; Croker, 2013; Dahlsrud, 2008). The concept has evolved considerably in recent years from the personal responsibilities of the employer to social responsibility in a broader sense (Carroll and Shabana, 2010).

The European Commission (2011) encouraged companies to adopt long-term socio-environmentally responsible strategic approaches. Respect for the applicable legislation and collective agreements between the social partners was set out as a prerequisite. Companies should integrate social, environmental and ethical concerns, respect for human rights and consumer concerns to maximize the creation of shared value for all parties involved, and identify, prevent and mitigate its possible adverse consequences. This way of understanding CSR considers the impact of the company on society and integrates those actions that the company performs voluntarily, once its legal obligations are complied with (Gowri, 2004). Progress is being made in the measurement and application of CSR. The UNE-ISO 26000:2012 standard is considered a CSR milestone, the result of a global consensus. The use of this standard allows a systematic, objective and independent process to be conducted to determine how the activity of the company satisfies the established requirements. The CSR audit can be used as a control tool (Asociación Española de Normalización y Certificación, 2012). Adopting the ISO 26000 standard is relatively straightforward in Europe because, in the past, it spearheaded the adoption of the ISO 9001 and ISO 14001 standards to good effect (Prado-Roman et al., 2018). There are a growing number of standards and certifications that overlap with ISO

26000 and, in a sense, compete with each other (Balzarova and Castka, 2018; Castka and Corbett, 2016; Castka, Searcy and Mohr, 2020). Therefore, it is necessary to carry out a review of the standards and certifications to coordinate and/or reduce them, thus preventing confusion in companies.

Many companies focus CSR primarily on occupational health and safety, as well as ethical business practices and environmental management, yet they neglect the external dimension. Companies in the construction sector can contribute positively to the development of communities and respond to social changes, as well as identifying the degree of involvement with their stakeholders (Vallina, 2020). Despite the fact that CSR is being put into practice in the construction sector, to a large extent, informally and is in its early stages of development, the results of Lim and Loosemore (2017) show that, as companies grow, they tend to seek a strategic approach to create public value, take care of their socially responsible image and improve their competitiveness.

Darko, et al. (2019) reviewed the practices adopted by the stakeholders of construction companies in countries such as the United States, Australia, the United Kingdom, India and China, and confirmed that, at the end of the 20th century, the construction sector took CSR into account and, as the socio-environmentally responsible vision spreads, the interest of the agents involved in the construction process and of the researchers in the sector grows. Xia, *et al.* (2018) say that the development of actions in the social dimension is predominant. Furthermore, Zhang and Chan (2017) identify indicators, such as MIVES, LEED, Green, among others, which aim to improve the understanding of what they call "*Green Building*", and which serve to encourage more responsible building. The commitment to CSR also depends on the education and training of entrepreneurs (Sarhan and Fox, 2013), as well as on other factors that can act as a barrier or facilitate its development such as: cultural barriers, lack of technology and ecological techniques, quality of specifications, stakeholder participation, guidance and benchmarking systems (Jamil and Fathi, 2016).

Sustainability in construction is the process by which all the stakeholders involved —owners, designers, building companies, management teams, suppliers of materials and construction products and administration— integrate functional, economic, environmental and quality considerations to produce and renovate buildings, their surroundings and their impact on the said surroundings (IHOBE, 2010). In the case of the Spanish construction sector, there is no generalized CSR strategy, but rather extensive legislation focused on contributing to the sustainability of structures. If the project establishes requirements related to social, environmental and economic criteria, the execution must be consistent with these requirements (Ministerio de Presidencia, 2008; Ministerio de Transportes, Movilidad y Agenda Urbana, 2021). Although the use of sustainability assessment tools is necessary in all phases of the construction process, it is essential in the design stage, since most of the decisions affecting the entire useful life of the building are made at this stage. For this paradigm shift to take place, we must evolve towards a way of building with a more fluid interaction between the built heritage and the natural environment, and CSR contributes to this, without forgetting the other dimensions of sustainability, taking into account the principles of the circular economy (Kurniawati and Mujiyati, 2023; Opoku, 2019).

Sustainability, sustainable development, is currently articulated through the United Nations 2030 Agenda (United Nations, 2015; 2020). From its approval in 2015 to the present day, its prominence has been increasing. Several of these goals must be considered to the construction sector for their achievement, so once again it becomes clear that CSR is the perfect strategy to achieve sustainability in the construction sector and its companies (Burón-Maestro, 2007; Lu and Zhang, 2016; Opoku, 2019; Ye, *et al.*, 2019; Zhang, *Oo and Lim*, 2022).

At present, environmental product declarations only calculate the impacts of materials in the product phase, they do not report on the rest of the life cycle stages. Nor is there a known way of accurately assessing the contribution of materials to the sustainability of the building. Other tools for assessing the

sustainability of the building provide information on the global behaviour of the building, for example, the life cycle analysis of the construction products or materials used in buildings. These and other approaches are incomplete, and it would be a useful exercise to review them, as this sector necessarily manages large amounts of data, a good option is to use methodologies based on building information modelling (BIM). One can speak of more sustainable construction materials or products in cases where all the information, the environment and the complete life cycle are integrated (Domínguez-Herrera, González-Morales and González-Díaz, 2018; Rezaei, Bulle and Lesage, 2019). Definitely, a paradigm shift is required to solve ecological and social problems that are structural, not temporary (European Commission, 2020a; 2020b; Schneider, 2020).

The empirical analysis for this work has been carried out on four islands of Santa Cruz de Tenerife province (Canary Islands, Spain), an outermost region of the European Union located in the Atlantic and economically characterized by its high dependence on tourism associated with a growing construction sector, dedicated to renovations and new buildings. In island tourist destinations, the need to establish a viable balance between economic, sociocultural and environmental impacts of tourism is more evident (Graci and Doods, 2010). In this scenario, the environmental impacts derived from construction activity, such as increased pressure on land use or waste generation in limited spaces, require specific management so that, in the long term, it does not end up destroying landscape. In this sense, public authorities play a fundamental role, since they are responsible for developing construction planning and monitoring strategies, this being a highly regulated sector (e.g., Structural Concrete Instruction). There is an intricate interconnection between government entities and the private sector, and it is necessary to establish joint action aimed at achieving long-term sustainability goals.

Hypothesis and Methodology

Based on the theoretical framework developed in the previous section, the following hypotheses are proposed, in which the perception of good CSR practices, their sensitivity towards the three dimensions of sustainability and whether the environmental dimension is given more importance are studied in the case of companies in the construction sector in the province of Santa Cruz de Tenerife for the first time.

HYPOTHESIS

H1. There are differences between the valuations of the shares in terms of CSR depending on whether the company in the construction sector has or does not have a CSR strategy.
H2. Companies in the construction sector that have a CSR strategy value all the aspects that CSR encompasses (environmental, economic and social contribution) to the same extend.
H3. Environmental sensitivity is the most influential factor for companies in the construction sector to assess the possibility of implementing a CSR strategy in the future.

Table 1 shows the relationship between the research questions, the hypotheses, the dimensions of sustainability to which CSR contributes and the research results for each group of companies investigated.

POPULATION AND SAMPLE SIZE

The population under study is companies in the construction sector that perform their activity in the province of Santa Cruz de Tenerife. This business fabric includes delegations of large national companies that coexist with other construction companies of various sizes, as set out by the European Union in its Directive 2013/34/EU (European Union, 2013), as well as developers, manufacturers of construction products and materials, contractors and builders.

Table 1. Methodological framework.

Three questions related to CSR remain after several decades of research.					
Research questions		Theoretical framework: CSR and sustainability in the construction sector	References	Hypothesis/ sustainability dimension	Results table
1st	There is no single definition of CSR	– In the context of this research the definition is the European Commission one. – The concept has evolved considerably in recent years from the personal responsibilities of the employer to social responsibility in a broader sense.	– Aguinis and Glavas (2012) – Asociación Española de Normalización y Certificación (2012) – Balzarova and Castka (2018) – Carroll and Shabana (2010) – Castka and Corbett (2016) – Castka, Searcy and Mohr (2020) – Croker (2013) – Dahlsrud (2008) – European Commission (2001; 2011; 2012) – Gowri (2004)	– H1 – Factor 2. Economic aspects	Table II
2nd	The empirical relationship between company profitability and CSR has not been resolved	– Companies in the construction sector can contribute positively to the development of communities and respond to social changes, as well as identifying the degree of involvement with their stakeholders. – The commitment to CSR also depends on the education and training of entrepreneurs.	– Jamil and Fathi (2016) – Sarhan and Fox (2013) – Cherian, *et al*. (2019) – Darko, Zhang and Chan (2017) – Darko, *et al*. (2019) – Lim and Loosemore (2017) – Vallina (2020) – Xia, *et al*. (2018) – Zeng (2016)	– H2 – Factor 3. Aspects on social contribution	Table III

Table 1. continued

Three questions related to CSR remain after several decades of research.					
Research questions		Theoretical framework: CSR and sustainability in the construction sector	References	Hypothesis/ sustainability dimension	Results table
3rd	CSR should be voluntary or mandatory?	– In the case of the Spanish construction sector, there is no generalized CSR strategy, but rather extensive legislation focused on contributing to the sustainability of structures. – CSR is the perfect strategy to achieve sustainability in the construction sector and its companies. – Environmental product declarations only calculate the impacts of materials in the product phase, they do not report on the rest of the life cycle stages	– Abbas (2020) – Cascajero (2022) – Domínguez-Herrera, González-Morales and González-Díaz (2018) – European Commission (2020a; 2020b) – Graci and Doods (2010) – IHOBE (2010) – Kurniawati and Mujiyati (2023) – Ministerio de Presidencia (2008) – Ministerio de Transportes, Movilidad y Agenda Urbana (2021) – Opoku (2019) – Ogunmakinde, Egbelakin and Sher (2022) – Rezaei, Bulle and Lesage (2019) – Moneva-Abadía, Gallardo-Vázquez y Sánchez-Hernández (2019) – Schneider (2020) – United Nations (2015; 2020) – Ye, *et al*. (2019) – Zhang, *Oo and Lim* (2022)	– H3 – Factor 1. Aspects on environmental sensitivity	Table I

The population data were obtained from the statistics on companies registered in social security in the construction sector, prepared by the Canary Institute of Statistics. Table 2 shows the technical data sheet. Representativeness by business size was taken into account to calculate population heterogeneity. The sample size (n) was calculated according to:

$$n = \frac{z^2 \sigma^2 N}{e^2 N + z^2 \sigma^2} \quad (1)$$

z = % desired reliability for the mean

e = maximum permissible error for the sample mean

σ = variance

N = population size

Table 2. Technical data sheet

Population	2.137 (2015)
Area	Santa Cruz de Tenerife province
Information collection method	In-person survey, via Google Drive and by phone
Sample unit	Head of the company
Sample size	221
Surveys completed	73
Sample error	±9.02%
Confidence level	95% para z=1.96 y p= .8 q= .2
Data collection period	Year 2017

DATA COLLECTION TOOLS

A questionnaire was prepared whose questions were grouped into three groups: aspects of environmental sensitivity, economic aspects and aspects of social contribution, presented on a Likert (de 1 a 5) scale. They were regrouped into dichotomous variables to perform the descriptive analysis. In addition, two dichotomous questions were included for use as dependent variables. The questions of the questionnaire can be consulted in Tables I, II y III.

QUANTITATIVE TOOLS

Various descriptive and multivariate statistical techniques were applied using the SPSS 21 program. Firstly, the sample was divided into two groups: companies that have a CSR strategy in place (group 1) and companies that plan to implement one in the future (group 2). Contingency tables were then prepared depending on whether the company had or had not applied the corresponding action. The chi-square test was applied to check whether there were significant differences between these variables.

Secondly, the variables that were significant were used to perform two multiple linear regression (MLR) analyses, one for group 1 companies and the other for group 2 companies. The objective was to analyse the relationship between the dependent variable (Y), quantitative (criterion), and independent quantitative and/or dummy variables (predictor variables). A linear combination of all or some of the predictor/explanatory variables (Xi) that maximally correlated with the dependent variable (Y) was sought. Both models are summarized in the equation below:

$$Y = b_0 + b_1 X_1 + b_2 X_2 + \ldots + b_p X_p + \varepsilon \quad (2)$$

Y = dependent variable scores

Xi = explanatory independent variables scores (i = 1,…, p)

b_0 = constant

bi = estimated regression coefficients using the least squares method with n observations that measure the influence of the independent variables on the dependent variable (i = 1,…,p)

ε = error

The backward stepwise regression method was used to build an MLR model with a dependent variable of independent variables with a strong significant relationship. This method introduces all the predictor variables at the beginning of the analysis and, in each step, eliminates the variable whose Fisher's F is not significant, testing the null hypothesis. The process ends when all the p-values are significant, that is, less than .05. Given that two groups of companies are proposed, an MLR model is built for each group, which will be called hereinafter model 1 and model 2, respectively (Table 3).

Table 3. Variables used in the MLR

Dependent variable	Models 1 and 2 Y1 = The company has a CSR strategy in place Y2 = The company is thinking of putting a CSR strategy in place	Dichotomous variables
Independent variables	Factor 1. Aspects of environmental sensitivity	KMO .643 Bartlett sig. .000
	Factor 2. Economic aspects	KMO .611 Bartlett sig. .000
	Factor 3. Aspects about social contribution	KMO .743 Bartlett sig. .000

The items of the questionnaire required a transformation of the responses so that they could be used in the MLR in the form of factors that measure an overall result of each group of responses. This transformation was performed through an exploratory factor analysis for each group of aspects of the questionnaire, verifying their validity using the Bartlett's test of sphericity test and the Kaiser-Meyer-Olkin test (KMO). Bartlett's test of sphericity tests the null hypothesis of non-correlation of the variables in the population under study. If a high value is obtained, it means that there is a correlation between the factors and the null hypothesis is rejected; in this case it is possible to continue with the analysis as its values are suitable. The Kaiser-Meyer-Olkin test confirms the validity as the KMO index values are between .5 and 1.0 in all cases.

Results

DESCRIPTIVE RESULTS

This section describes the results obtained from the two groups under study: Group 1: affirmative responses (%) to each indicator on actions carried out in the past and Group 2: affirmative responses (%) to each indicator on actions planned to be carried out in the future.

As regards the aspects related to environmental sensitivity (Annex Table I), of the 42 items, nine were simultaneously significant for both groups (shaded in grey in Annex Table I). These nine common actions are related to the use of renewable energy sources, environmental impact, the frequency with which certain key actions are carried out in the management and use of natural resources, and the design of facilities that use energy and water efficiently. In general, the percentages are higher in companies that already have a CSR strategy in place (group 1). As an example of these differences, it is worth mentioning that 64% of group 1 companies know and apply, as criteria for choosing construction products, the environmental product declarations or the life cycle analysis, a percentage that is higher than the responses of group 2 companies that plan to implement the CSR strategy in the future (42.3%); in addition, 92% of the companies in group 1 reuse rainwater in the buildings they build, compared to 78.8% in group 2.

With respect to actions that are not common to both groups, in the case of group 1, there are the assessment of the environmental footprint of the building after its demolition (68%), the adoption of measures for the reuse of rainwater (68%), the choice of materials and construction processes that respect the environment (52%) and the research and development of new, more efficient construction techniques (60%). In group 2, the use of renewable energy sources is noteworthy (75%) and 99.9% do not believe that sustainability strategies only include water saving, comfort, life cycle analysis and the environmental footprint after demolition but that there are some social and economic aspects, in addition to the environmental aspect.

Regarding the economic aspects (Annex Table II), of the 21 items, only five (shaded in grey in Annex Table II) were significant and none were common between both groups. In group 1 companies, the importance they attach to building with socio-environmentally responsible criteria is noteworthy because maintenance costs of the building are reduced (96%). Likewise, it is worth mentioning that 100% of these companies consider that life cycle cost studies should be carried out in the early stages of the project because this provides greater opportunities to evaluate alternatives. In the group 2 responses, it is notable, on the one hand, that 67.4% think it is advisable to create a public web page for each work to inform the public of the characteristics, execution deadlines and economic data of the work; on the other hand, a negative finding is that 57% of those who do not plan to implement a CSR strategy in the future think that socio-environmentally respectful strategies do not have a favourable impact on the final price of the property.

Finally, with regard to the aspects of social contribution (Annex Table III), of the 36 items, eleven were simultaneously significant for both groups (shaded in grey in Annex Table III). As with the aspects of environmental sensitivity, the percentages are higher in group 1 companies. It is especially noteworthy that this facilitates the involvement of all interested parties in decision-making, and that the building's water quality is defined or that criteria are drawn up to quantify indicators for later comparison, among other actions. In addition, it should be noted that 92% of the companies that have a CSR strategy apply innovative methods that are the result of Research, Development and Innovation (R&D&i) conducted in the previous three years, compared to 71.2% of the companies that plan to implement it in the future.

If the analysis is done by group of companies, in group 1 it is worth mentioning that 100% have put in place voluntary health and safety actions that contribute to the employees' quality of life and think that their business activity affects the next generation. In group 2, 69.2% study the ability of people with specific needs to access certain services in the building and evaluate the visual comfort and the spatial characteristics of the building.

MULTIPLE LINEAR REGRESSION MODELS (MLR)

a. Model 1: A CSR model is in place.

The dependent variable of this model reflects whether the company already has or does not have a CSR strategy in place. When the MLR is performed, a model is obtained in which all the independent variables introduced are significant (Table 4).

An ANOVA analysis of variance was performed to evaluate the significance of the regression model, which resulted in p= .000. Therefore, the null hypothesis that the variability observed in the response is explanatory by chance is rejected and an association between the dependent variable and the independent variables is admitted.

$$Y1 = 1.342 + .185*Factor1 - .141*Factor2 + .160*Factor3 \quad (3)$$

Table 4. Coefficients of the first model where the dependent variable (Y1 in equation [3]) is that the company is thinking of implementing a CSR strategy

Model1	Non standardized coefficients		Standardized coefficients	t	Sig.
	B	standard error	Beta		
Constant	1.342	.048		27.756	.000
Factor 1	.185	.068	.387	2.719	.008
Factor 2	-.141	.063	-.295	-2.305	.024
Factor 3	.160	.057	.335	2.794	.007

Equation (3) represents a measure of the set of CSR actions carried out by companies in the construction sector that have a CSR strategy in place. This model shows that one more point in the assessment of the effect of environmental sensitivity aspects (Factor 1) favours an increase of .185 points in the implementation of CSR actions. This factor is the most influential. Regarding the economic aspects (Factor 2), the relationship is negative, it indicates that, as the valuation of the negative aspects increases one more point, the adoption of CSR actions decreases -.141 points. Finally, CSR actions in social contribution (Factor 3) increased by .160 for each unit.

b. Model 2: The company is thinking about putting a CSR strategy in place

The dependent variable of this model reflects whether or not the company plans to implement a CSR strategy in the future. When the MLR is performed with the backward stepwise regression method, three models are obtained (Table 5). In the first, only Factor 3 is significant. In the second model, Factor 2 is eliminated, although only Factor 3 is still significant. Model 3 eliminates Factor 1; therefore, Factor 3 is the one that is really having a significant impact on whether the company is considering implementing a CSR strategy in the future. The resulting equation is:

$$Y2 = 1.712 + .171*Factor3 \quad (4)$$

These two models show the differences between a socio-environmentally responsible company and one that is seriously thinking about integrating CSR strategies in the future. In the first case, the factors that have a positive influence are the environmental sensitivity aspects and the social contribution aspects, with the economic aspects having a negative influence. In the second case, the only factor with influence is the one that includes the social contribution aspects.

Table 5. Coefficients of the second model where the dependent variable (Y2 in equation [4]) is that the company is thinking about putting a CSR strategy in place.

Model	Variables	Non standardized coefficients		Standardized coefficients	t	Sig.
		B	standard error	Beta		
1	Constant	1.712	.050		34.329	.000
	Factor 1	.089	.070	.195	1.265	.210
	Factor 2	-.061	.063	-.134	-.971	.335
	Factor 3	.145	.059	.317	2.445	.017
2	Constant	1.712	.050		34.343	.000
	Factor 1	.052	.059	.114	.882	.381
	Factor 3	.144	.059	.316	2.432	.018
3	Constant	1.712	.050		34.397	.000
	Factor 3	.171	.050	.376	3.419	.001

Discussion

The objective of this work is focused on analysing the socially responsible behaviour of companies in the construction sector in a limited and fragmented territory as is the province of Santa Cruz de Tenerife and comparing the importance they place on CSR action depending on whether the company has it in place or plans to implement it in the future.

The methodology employed in this research has also been used by Zhang, Oo and Lim (2022), who identify and classify the practices and perceived benefits of CSR in construction companies using an online questionnaire and subsequently analyses the perception of CSR through the social networks of these companies. The quantitative and qualitative methodology used in this research was carried out through an in-depth study of the practices of these companies. The total number of companies analysed is in line with the work of this author. Their findings and those of Lu and Zhang (2016) are aligned in indicating that the skewed development of corporate sustainability in the construction sector, where much attention has been given to environmental issues at the project level, but the social dimension, such as stakeholders and social governance, is severely lacking and needs to be prioritized.

Regarding the hypotheses raised, the first hypothesis is fulfilled given that there are differences between the valuations of the actions in terms of CSR, depending on whether the company in the construction sector has or does not have a CSR strategy in place.

The second hypothesis is partially fulfilled, since it has been proven that aspects related to environmental sensitivity and social contribution contribute to a large extent to the implementation of a CSR strategy, while economic aspects have a negative influence. These results are partly in line with the conclusions of Watts, Dainty and Fernie (2015) and Zhang, Oo and Lim (2019), who suggest that environmental actions prevail over other types of actions, although without losing sight of the positive image projected by social actions.

Likewise, in the case of companies that plan to implement a CSR strategy in the future, it is observed that the aspect related to social contribution really has the most influence, meaning that hypothesis 3 is

not being fulfilled as environmental aspects were the most influential. In the same vein, Xia, *et al.* (2018), say that, in recent years, the social dimension has predominated in line with environmental aspects, with economic aspects being less important.

The originality of this research lies in using the indicators in Annex 13 of the Structural Concrete Instruction (Ministerio de Presidencia, 2008) as independent variables, whose relationship with the construction sector is direct. Furthermore, the analysis distinguishes between companies that have a CSR strategy in place from those that plan to implement it in the future. The information contained in this work makes it possible to evaluate the CSR strategy of the participating companies to make decisions that reinforce and/or complement existing actions, as well as reflect on which actions are most valued, which ones would be necessary to include, and which ones would be necessary to enhance in a future strategy.

After the dates on which this research was carried out, the new Structural Code (Ministerio de Transportes, 2021; Cascajero, 2022) was published, replacing the Structural Concrete Instruction (Ministerio de Presidencia, 2008). It should be noted that the annex used during this research became part of the articles in the current Code. To this we should add the work of Ye *et al.* (2019), whose review of CSR reports of international companies highlights the lack of work in this field in Spain. All of this makes this research even more valuable.

Conclusions

The aim of this work was focused on analysing the socially responsible behaviour of companies in the construction sector to verify what practices carried out by these companies and the weight of their contribution to the economic, social and environmental dimensions, comparing the importance that companies place on CSR actions depending on whether they have been implemented or there are plans to implement them in the future.

At present, the limitation of the study may be due to its possible lack of generalization because it has been applied to a Spanish province with a construction sector that is depends largely on a tourism sector with a lot of weight in the provincial business structure.

In this case it is concluded that it is necessary to contribute to raising awareness and disseminating good CSR practices in both groups studied. In particular, to integrate sustainability into CSR objectives. To raise awareness that the management of a building's energy resources is part of one of the dimensions of CSR: environmental sensitivity. In the same sense, to improve knowledge of the impact of CSR on the economic performance of companies and to carry out further studies in this respect.

There is still a long way to go. It is necessary to inform and train those responsible for making business decisions to make them understand the importance of the effects of their activity on the environment and that, if well managed, and by applying a CSR strategy, could be a source of opportunity.

Another point to bear in mind is the public health situation caused by COVID-19; but, at the same time, this situation becomes an opportunity for the construction sector, which can contribute to the improvement of other economic sectors. As an example, the hotel sector, which requires a renovation the existing hotel stock or new construction that takes the new panorama into account, which demands that the construction sector be more creative, innovative and more sustainable, putting the bases in place to start a CSR strategy.

Future research will be aimed at increasing awareness and dissemination of good CSR practices. A panel of indicators is expected to be developed to monitor the contribution of CSR to the construction process, which would provide a choice of the most sustainable solutions, with the aim of collaborating in the management of environmental, economic, social and environmental impacts. During the period under review for the publication of this article, the new Structural Code has entered into force, now it will be possible to see whether the proposed model meets the needs to promote a socially responsible vision.

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Annex

Table I. Valuations of actions related to environmental sensitivity, by group (%)

Factor 1. Aspects on environmental sensitivity	Group 1: Affirmative responses (%) to each indicator on actions carried out in the past		Group 2: Affirmative responses (%) to each indicator on actions planned to be carried out in the future	
	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy
P.1. In the design / execution of a building, what importance do you assign to the following aspects?				
1.1. Rehabilitation of an existing building as an alternative to the construction of another new plant.	89.6	96.0	85.7	94.2
1.2. Choice of location based on the revitalization of underused or abandoned land.	83.3	92.0	90.5	84.7
1.3. Connectivity or proximity of public transport to its final location.	87.4	92.0	81.0	92.3
1.4. Variation of the natural water cycle.	72.9	88.0	61.9	84.6
1.5. Control and reuse of rainwater.	85.5	92.0	76.2	92.3
1.6. Selection of vegetation in landscaped spaces that requires less irrigation water.	95.9	96.0	95.2	96.2
1.7. Choice of suppliers or manufacturers of construction products and materials that are responsible with the environment.	87.5	92.0	85.8	90.3
1.8. Taking care of the quality of living spaces.	95.8	100.0	95.2	98.1
P.2. Do you or do you not carry out the following actions on the buildings you run?				
2.1. Uses or proposes the use of renewable energy sources.	64.6	72.0	47.6	75.0
2.2. It is important to know the distance between the supplier and the work when choosing it.	64.6	88.0	61.9	76.9
2.3. Knows and applies the Environmental Declarations or the Life Cycle Analysis as criteria for choosing construction products.	20.8	64.0	19.0	42.3
2.4. Assesses the environmental footprint of the building after its demolition.	35.4	68.0	33.3	51.9
2.5. It takes into account the reuse of rainwater.	64.6	92.0	61.9	78.8
2.6. Choose lower consumption sanitary appliances.	81.3	84.0	81.0	82.7
2.7. Adopt measures for the reuse of grey water.	14.6	68.0	23.8	36.5
2.8. Manages construction and demolition waste (RCD's).	77.1	84.0	71.4	82.7

Table I. continued

Factor 1. Aspects on environmental sensitivity	Group 1: Affirmative responses (%) to each indicator on actions carried out in the past		Group 2: Affirmative responses (%) to each indicator on actions planned to be carried out in the future	
	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy
P.3. In the case of buildings, what is the degree of importance that you give to the environmental impact in each of the following phases and stages?				
3.1. Extraction and processing of raw materials.	93.8	96.0	90.4	96.1
3.2. Transportation of raw materials to the producer.	79.1	88.0	66.7	88.4
3.3. Construction product manufacturing.	85.5	92.0	81.0	90.4
3.4. Transportation of construction products to the construction site.	83.4	88.0	71.4	90.4
3.5. Preliminary draft.	75.0	84.0	71.4	80.8
3.6. Building project.	79.2	92.0	76.1	86.6
3.7. Building construction process.	91.6	92.0	90.4	92.3
3.8. Consumption of water and energy during the period of use of the building.	93.7	100.0	95.3	96.2
3.9. Cost of maintenance, repair, replacement and renovation of construction elements during the period of use of the building.	93.7	100.0	95.2	96.2
3.10. Use of the building when all services and facilities are working.	97.9	96.0	100.0	96.2
3.11. Demolition of the building at the end of its useful life.	60.5	84.0	57.1	73.1
3.12. Management of construction and demolition waste (RCD's), processing, transport and final deposit.	95.9	100.0	100.0	96.1
P.4. Indicate the importance that you assign in the design / execution of a building to the following aspects				
4.1. The Public Administration must intervene in urban planning by creating environmental assessment instruments.	93.8	92.0	90.6	94.2
4.2. It is necessary to make changes in the land law that makes energy rehabilitation viable.	91.7	88.0	80.9	94.2
4.3. Construction materials and products that are manufactured using waste from other materials or processes as raw materials should preferably be used.	95.9	96.0	95.2	96.2
4.4. The Public Administration should draw up stricter regulations regarding limit temperatures in the air conditioning of spaces for public use.	91.7	82.0	85.8	90.3

Table I. continued

Factor 1. Aspects on environmental sensitivity	Group 1: Affirmative responses (%) to each indicator on actions carried out in the past		Group 2: Affirmative responses (%) to each indicator on actions planned to be carried out in the future	
	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy
4.5. The concept of Sustainability in Construction and Energy Efficiency in Buildings are equivalent.	56.3	56.0	57.1	55.8
P.5. Please indicate your degree of agreement with the following statements				
5.1. Sustainability is related only to environmental criteria.	79.2	92.0	80.9	84.7
5.2. In sustainable strategies, the social and economic aspect must be considered, in addition to the environmental one, this has not been adequately developed in the building sector.	93.8	96.0	90.6	96.2
5.3. Sustainability strategies in construction include only: saving water, comfort, life cycle analysis and the environmental footprint after demolition.	79.2	80.0	99.9	71.2
P.6. Please, indicate how often you carry out the following actions.				
6.1. Choice of materials and construction processes taking into account environmentally responsible extraction and production.	10.4	52.0	19	26.9
6.2. Choice of construction materials and products that have undergone a Life Cycle Analysis, from cradle to grave or cradle to cradle.	10.4	20.0	19	11.5
6.3. Management and reuse of the natural resources of the environment that it transforms with the building.	22.9	56.0	9.5	44.2
6.4. Design of facilities that make efficient and rational use of energy and water.	41.7	72.0	33.3	59.6
6.5. Forecast of changes in the use of buildings in order to increase their useful life and / or reduce the impact of their use.	22.9	52.0	14.3	40.4
6.6. Research and development of new, more efficient construction techniques.	27.1	60.0	33.3	40.4

Table II. Valuations of actions related to economic aspects, by Group (%)

Factor 2. Economic aspects		Group 1: Affirmative responses (%) to each indicator on actions carried out in the past		Group 2: Affirmative responses (%) to each indicator on actions planned to be carried out in the future	
		Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy
P.7. How important is the following to you?					
7.1.	It is appropriate to penalize high consumers of water and electricity who do not demonstrate efficient use of their facilities.	91.6	76.0	90.5	84.6
7.2.	Mandatory energy audits must be carried out and those responsible for non-compliance punished.	91.7	80.0	80.9	90.4
7.3.	Socio-environmentally friendly strategies have a favourable impact on the final price of the property.	45.8	40.0	57.0	38.5
7.4.	Indicators should be established that allow deciding whether the actions are adequate from the economic point of view.	98.0	96.0	100.0	96.1
7.5.	The levels of production and development of clean technologies must be improved.	100.0	100.0	100.0	100.0
7.6.	It is advisable to develop a public web page for each work to inform the citizen of the characteristics, execution deadlines and financial data.	60.4	64.0	47.6	67.4
P.8. Please indicate your degree of agreement with the following statements					
8.1.	Socio-environmentally responsible construction brings economic advantages.	72.9	92.0	71.4	82.7
8.2.	The existence of incentives on the part of the Public Administration is necessary in the form of reduction of taxes linked to real estate executed by socio-environmentally responsible companies.	93.8	100.0	95.3	96.2
8.3.	Building maintenance costs are lower if it is built with socio-environmentally responsible criteria than with traditional methods.	79.1	96.0	76.2	88.4
8.4.	The final price of a home or building built with socio-environmentally responsible criteria is lower compared to other buildings that do not include these criteria.	75.0	80.0	76.1	77.0
8.5.	Incentives should be created for the certification of Corporate Social Responsibility (CSR) of properties.	95.9	92.0	90.5	96.1

Table II. continued

Factor 2. Economic aspects	Group 1: Affirmative responses (%) to each indicator on actions carried out in the past		Group 2: Affirmative responses (%) to each indicator on actions planned to be carried out in the future	
	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy
P.9. How important is the following statements?				
9.1. 80% of the costs of operation, maintenance and repair of a building are set early in the design process, which is why it is so important to establish strategies in that phase.	91.7	80.0	90.5	86.6
9.2. The life cycle cost study should be done in the early stages of the project to provide greater opportunities to evaluate alternatives.	91.6	100.0	85.8	91.1
9.3. The material execution budget is the ideal tool for evaluating financial aspects.	68.7	64.0	66.7	67.3
9.4. It is interesting to propose other indices in the Project phase that are transparent and verifiable to assess the economic aspects.	97.9	96.0	95.3	98.1
9.5. It is convenient to assign sustainability indicators to concrete and other construction products through specifications, characteristics and performance.	98.0	84.0	95.2	92.3
P.10 Indicate the degree of impact on the cost of the building of the following actions				
10.1. The final price of a building designed to suit people with specific needs is higher.	45.8	56.0	47.6	50.0
10.2. The economic viability of a project that foresees changes in the use of a building throughout its useful life is lower.	64.5	80.0	71.4	69.2
10.3. It is not profitable to apply modifications or improvements that are not required by current regulations.	81.3	76.0	80.9	78.9
10.4. Providing all stakeholders with the path to get involved in decision making increases profitability.	89.7	92.0	90.4	90.4
10.5. By improving the working conditions of employees, you improve productivity.	93.8	96.0	95.2	94.2

Table III. Valuations of shares related to their social contribution, by Group (%)

Factor 3. Aspects on social contribution		Group 1: Affirmative responses (%) to each indicator on actions carried out in the past		Group 2: Affirmative responses (%) to each indicator on actions planned to be carried out in the future	
		Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy
P.11	**Indicate the frequency with which you carry out actions related to the health and comfort of the users of the building**				
11.1.	Study the ability of people with specific needs to access certain services in the building.	56.3	68.0	38.1	69.2
11.2.	Make a forecast of the capacity of the building to adapt to the requirements of the residents and to changes in those requirements throughout its useful life.	41.7	52.0	33.3	50.0
11.3.	Study the acoustic conditions of the building.	45.8	64.0	33.3	59.6
11.4.	Analyse the indoor air quality of the building.	27.1	52.0	14.3	44.2
11.5.	Evaluate the visual comfort and spatial characteristics of the building.	50.0	60.0	28.6	63.5
11.6.	Defines the quality of the building's water.	14.6	68.0	14.3	40.4
11.7.	Assess the electromagnetic characteristics of the building.	6.3	28.0	4.8	17.3
11.8.	Assess the thermal comfort of the building.	43.8	60.0	23.8	59.6
11.9	It takes into account the access to private open spaces from the dwellings	47.9	56.0	28.6	59.6
11.10.	Look for solutions to protect the interior of the houses from the views from the outside.	54.2	48.0	47.8	53.8
11.11.	Designs mechanisms to control the lighting system in non-residential areas of occupation.	45.8	60.0	38.1	55.8
11.12.	Provides for the control of heating, cooling and ventilation systems in non-residential areas of occupation.	37.5	64.0	33.3	51.9
P.12	**Indicate the frequency with which you carry out actions related to the load of the building**				
12.1.	Design mechanisms to reduce noise.	37.5	64.0	23.8	55.8
12.2.	Look for solutions to control emissions to outdoor air, soil and water.	47.9	60.0	42.9	55.8
12.3.	He designs elements to attenuate the glare and over-sunlight that could be generated in the surrounding buildings.	18.8	44.0	14.3	32.7

Table III. continued

Factor 3. Aspects on social contribution	Group 1: Affirmative responses (%) to each indicator on actions carried out in the past		Group 2: Affirmative responses (%) to each indicator on actions planned to be carried out in the future	
	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy
12.4. It indicates how to reduce impacts and vibrations during all phases of the building process.	31.3	52.0	23.8	44.2
12.5. Develop and implement a Maintenance Management Plan.	33.3	60.0	19.0	51.9
12.6. It establishes the maintenance operations including those carried out by the user himself.	39.6	60.0	28.6	53.8
P.13 Indicate the frequency with which you carry out actions related to the security of the building				
13.1. Designs strategies in relation to resistance to climate change: rain, wind, snow, floods, solar radiation, temperature.	20.8	56.0	23.8	36.5
13.2. Calculate resistance to accidental situations: earthquakes, explosions, fire, traffic impacts.	35.4	60.0	23.8	51.9
13.3. Design security elements against vandalism and intruders.	39.6	56.0	33.3	50.0
13.4. Establishes security mechanisms against supply interruptions.	33.3	60.0	42.9	42.3
P.14 Indicate the frequency with which you carry out CSR actions				
14.1. It is responsible for the traceability of the products and services it provides.	56.3	72.0	52.4	65.4
14.2. It facilitates the possibility for all interested parties to get involved in decision-making.	43.8	76.0	38.1	66.5
14.3. Establishes criteria to quantify indicators for later comparison.	16.7	64.0	9.5	42.3
14.4. When it is not possible to quantify them, it establishes qualitative criteria and verifies those using checklists.	16.7	52.0	23.8	30.8
14.5. For each work, it prepares a free access web page to inform the citizen, including characteristics, execution deadlines, economic and social implications.	6.3	4.0	4.8	5.8

Table III. continued

Factor 3. Aspects on social contribution	Group 1: Affirmative responses (%) to each indicator on actions carried out in the past		Group 2: Affirmative responses (%) to each indicator on actions planned to be carried out in the future	
	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy	Company in the construction sector **without** a CSR strategy	Company in the construction sector **with** a CSR strategy
P.15 Indicate the importance you attach to the following statements				
15.1. Society demands that construction companies improve the service, for this it is convenient to establish indicators that allow evaluating social actions.	87.5	88.0	85.7	88.5
15.2. To contribute to the quality of life of employees, voluntary health and safety measures will be adopted in addition to the mandatory ones.	85.5	100.0	85.7	92.3
15.3. At least 30% of the personnel working in the execution of the structure have had specific training courses in technical, quality or environmental aspects.	81.2	84.0	80.9	82.8
15.4. It should be ensured that the building maintains a good relationship with the urban environment with involvement in its development, it is essential.	95.9	100.0	95.2	98.1
15.5. It proposes possible changes in the use of the buildings it builds in order to increase its useful life	85.5	88.0	85.7	86.5
15.6. It considers that it has responsibility in the way of creating built-up spaces.	87.5	84.0	76.2	90.4
15.7. It applies innovative methods that are the results of R&D&i projects carried out in the last 3 years.	50.0	92.0	47.5	71.2
15.8. Your business activity has an impact on the next generation.	87.5	100.0	90.5	92.3
15.9. Awareness campaigns should be promoted to publicize socio-environmentally responsible construction.	97.9	96.0	95.3	98.0