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RESEARCH ARTICLE

Commitment to sustainability in large European banks and its relationship with board gender diversity: a 2030 Agenda perspective

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Abstract
Ensuring a sustainable future by meeting the Sustainable Development Goals (SDGs) cannot be achieved without women's empowerment and gender equality. This study aims to determine whether there are differences between European banks in terms of their commitment to SDGs and the intensity of this commitment depending on their board gender diversity. A sample of the 50 largest European banks from 2016 to 2020 was used to perform hypothesis testing for differences in means. The results provide robust support for the assertion that banks with greater female representation on the board of directors have a greater commitment to the 2030 Agenda. The originality of this research lies in the use of indicators of commitment to SDGs corresponding to each of the five SDG pillars. This study thus provides the first evidence of the importance of distinguishing between these pillars when examining the relationship between commitment to SDGs and board gender diversity. This evidence advances the scant literature on this relationship.

Keywords: 2030 Agenda; banking sector; board of directors; corporate social responsibility; gender diversity; sustainable development goals

In September 2015, the General Assembly of the United Nations (UN) adopted the 2030 Agenda for Sustainable Development. The 2030 Agenda is an action plan for people, planet and prosperity, which sets out a series of goals to be achieved within 15 years (United Nations, 2015). Specifically, it establishes 17 Sustainable Development Goals (SDGs) aimed at promoting awareness and taking joint global action towards a more sustainable future (Avrampou, Skouloudis, Iliopoulos, & Khan, 2019). These 17 SDGs can be arranged into five pillars (people, prosperity, planet, peace and partnership). Unlike their predecessors, the Millennium Development Goals, the SDGs were created based on active involvement from the private sector. The aim is for companies to apply their creativity and innovation to help resolve the challenges of sustainable development. Therefore, the SDGs offer the ideal agenda for all companies and institutions wishing to revise or update their strategic planning in corporate social responsibility (CSR) (Pillai, Slutsky, Wolf, Duthler, & Stever, 2017).

Consequently, collaboration from the business sector is essential to achieve the SDGs by 2030. The financial industry, particularly the banking sector, is a vital business area for the achievement of the SDGs (Avrampou et al., 2019; Krech, Kickbusch, Franz, & Wells, 2018; Ziolo, Bak, &

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Cheba, 2021). First, banks make a unique contribution to the economic development of nations. One of the ways they do so is by creating a financial infrastructure that enables people and businesses to function and develop. However, they can also invest their customers' savings in safe and profitable investments, whilst seeking to anticipate economic and social exclusion, act lawfully, ethically and in accordance with human rights, equality and diversity, and care for employees and the environment (Matuszak, Różańska, & Macuda, 2019). In addition, given their ability to mobilise huge amounts of resources, they represent a major economic driver that can propel the transition towards a more inclusive and sustainable economy. They can also make a substantial contribution to social and environmental causes (Moyo & Rohan, 2006). Therefore, financial inclusion is crucial to achieve sustainable development because, as noted in the Goldman Sachs Sustainability Report (2021), noninclusive growth cannot be sustainable. By providing more equitable access to financial services, financial inclusion can improve the lives of both individuals and communities, which is a key factor in achieving the SDGs. Specifically, according to Klapper et al. (2016), the inclusion of people in the financial system directly contributes to eradicating poverty by allowing people to invest in education or start a business (SDG 1). It also helps achieve gender equality (SDG 5) by giving women control over their finances.

This intermediary role of the banking sector reveals its key contribution to the achievement of the SDGs by enabling access to the funding necessary to address these goals. Banks thereby help overcome one of the principal problems faced by many countries, especially those in development (Ziolo, Bak, & Cheba, 2021). This role is particularly important given the high cost of implementing the SDGs (Kumar, Kumar, & Vivekadhish, 2016). In terms of specific SDGs, there are other examples of the banking sector's importance in enabling the achievement of these goals. For instance, the banking sector plays a key role in improving health in society by promoting investment in health care services in order to ensure equal access to such services for the entire population. Therefore, the banking sector helps advance towards achieving SDG 3 (Good health and well-being) (Krech et al., 2018). The banking sector also makes a notable contribution to achieving SDG 13 (Climate action) by helping reduce emissions through 'green finance' (Meo & Karim, 2022). In any case, the SDGs are interrelated, so contributing to the achievement of a given SDG also indirectly contributes to the achievement of others (Collste, Pedercini, & Cornell, 2017). At the same time, banks should align their actions with the SDGs not only to meet the demands and needs of stakeholders but also to gain crucial competitive advantages such as strengthening their social reputation (Forcadell & Aracil, 2017).

However, achieving the SDGs is not possible without mechanisms to empower women and establish effective gender equality and diversity (Gallego-Sosa, Gutiérrez-Fernández, Fernández-Torres, & Nevado-Gil, 2021; Hepp, Somerville, & Borisch, 2019), meaning that commitment to SDG 5 (Gender equality) is vital (Rai, Brown, & Ruwanpura, 2019). Thus, initiatives that promote gender diversity in organisations are necessary (Valls-Martínez, Cruz Rambaud, & Parra Oller, 2019), given that female representation at the senior corporate level is generally low around the world (Kiliç, Kuzey, & Uyar, 2015). This low representation also applies to the banking sector (Birindelli, Iannuzzi, & Savioli, 2019), highlighting the need to address the gender diversity of these organisations at the board level.

Previous research has focused on nonfinancial organisations, excluding banks in many cases because of their unusual accounting system (Birindelli, Iannuzzi, & Savioli, 2019). Therefore, there is less knowledge about this issue in relation to financial institutions. Similarly, although the importance of board composition for a firm's financial performance has been extensively studied, research on the relationship between board composition and corporate sustainability practices is scarcer (Kyaw, Olugbode, & Petracci, 2017; Naciti, 2019). This scarcity is particularly noticeable in relation to practices associated with the SDGs. Specifically, only Gallego-Sosa, Fernández-Torres, & Gutiérrez-Fernández (2020), Girón, Kazemikhasragh, Cicchiello, and Panetti (2020), Rosati and Faria (2019) and Pizzi, Rosati, and Venturelli (2021) have studied the relationship between board characteristics such as gender diversity and commitment to the 2030 Agenda.

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Therefore, addressing gender issues in the field of management and studying their repercussions for banks' commitment to sustainability is essential. The importance of this issue is also heightened by the fact that the study of this sector involves considering its complexities, which means that boards of directors play a crucial role in achieving high performance. These complexities include massive information asymmetries between stakeholders (Rahman, Zahid, & Khan, 2021). This feature is enhanced by the fact that banks have more stakeholders than nonfinancial institutions, given the existence of specific agents in the banking sector that do not exist in other sectors (Mehran, Morrison, & Shapiro, 2011). This idiosyncrasy makes the governance systems of banks fundamental because internal conflicts arising from the number of stakeholders can lead to a loss of market confidence in these institutions' ability to manage investments, which may eventually result in a financial crisis (García-Marco & Robles-Fernández, 2008).

Moreover, given the opacity of this sector (Morgan, 2002), banks have been subject to extremely strict, specific laws regulating capital and risk requirements since the Great Depression (Matuszak, Różańska, & Macuda, 2019). This regulatory situation hinders the effective control of banks by their stakeholders, making the board of directors particularly important as a governance and control mechanism (Huang, 2010).

The above reasons provide a compelling justification of the aims of the present study. Specifically, this study aims to determine whether there are differences between European banks in terms of their commitment to SDGs and the intensity of this commitment depending on their board gender diversity. The reasons for choosing this research question include the relevance of commitment from the business sector in general, particularly the banking sector, to the 2030 Agenda in order to tackle the challenge of building a sustainable world. Furthermore, there is a low level of female representation on the boards of banks, and there is scant evidence of the consequences of this low representation in terms of sustainability, specifically in relation to the SDGs.

To carry out the analysis, the 50 European banks with the largest market capitalisation over the period 2016–2020 were analysed using hypothesis testing based on difference in means. The geographical scope of the sample was suitable because, even though banks in this region pay little attention to their CSR actions (Venturelli, Cosma, & Leopizzi, 2018), Europe is something of a leader in terms of gender-related actions and regulations in management and CSR. For instance, many European countries have adapted their corporate governance regulations to include initiatives to promote gender diversity on corporate boards (Martínez-García & Gómez-Ansón, 2020). Moreover, a European Parliament and Council Directive has set a target of 40% presence of the least represented gender amongst the nonexecutive directors of large listed companies (European Commission, 2012). Finally, there are several proposals designed to promote the implementation of socially responsible practices, with examples including Directive 2014/95/EU (European Commission, 2014), the Europe 2020 Strategy for Sustainable and Inclusive Growth (European Commission, 2010) and the European Climate Law (European Commission, 2021).

This study therefore aims to make several contributions to the literature. First, it offers the first analysis that uses indicators of CSR as a series of measures that quantify participation and intensity of participation in the five pillars of the 2030 Agenda (prosperity, people, planet, peace and partnership). Although several studies have examined adoption of the 2030 Agenda (Girón et al., 2020; Kiefner, Mohr, & Schumacher, 2022; Pillai et al., 2017; Rosati & Faria, 2019) or commitment to each SDG (Ali, Hussain, Zhang, Nurunnabi, & Li, 2018; Avrampou et al., 2019; Cosma, Venturelli, Schwizer, & Boscia, 2020; Gallego-Sosa et al., 2021), they have not distinguished between the five pillars. Notable examples of such studies include those by Avrampou et al. (2019), Cosma et al. (2020) and Gallego-Sosa et al. (2021), who focused on the European banking sector, the context of the present study. However, this distinction between pillars is relevant for two reasons. First, it enables disaggregated analysis for each of the economic, social and environmental dimensions of CSR (United Nations Development Group, 2017). This approach is possible thanks to the direct relationship between certain pillars and the dimensions of CSR (the prosperity pillar is linked to the economic dimension, the people pillar is linked to the social

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dimension, and the planet pillar is linked to the environmental dimension). Moreover, the United Nations (2015) has reported that these five pillars cover critical areas for humanity and planet Earth, which is why these areas form the backbone of the 2030 Agenda. In turn, each of these areas has its own different aims. Therefore, the process of addressing these areas requires different company strategies, actions, processes and resources. Consequently, when analysing the commitment of organisations to the SDGs, it is important to control for differences in terms of performance in each of these areas. Second, the length of the time frame of the study is longer than in previous research, covering the first five years of the 2030 Agenda (2016–2020). This time frame made it possible to collect all available data on the evolution of the commitment of the banking sector to the SDGs. Finally, for the first time, this study provides evidence of the importance within the banking sector of ensuring gender diversity at the board level to ensure greater commitment to four of the five pillars of the 2030 Agenda.

Following this introduction, this paper has four more sections. Section 'CSR and gender diversity on corporate boards' reviews theories of the gender–CSR performance relationship and studies of this relationship. This review pays special attention to the five pillars of the SDGs. Section 'Sample and method' explains the sample and the variables, as well as the method. Section 'Results and discussion' presents and discusses the results. Finally, Section 'Conclusions' offers the conclusions, limitations and future lines of research.

CSR and gender diversity on corporate boards

Theoretical framework

Several studies have shown that gender diversity is a corporate governance characteristic that influences CSR (Disli, Yilmaz, & Mohamed, 2022; Harjoto, Laksmana, & Lee, 2015; Uyar, Kilic, Koseoglu, Kuzey, & Karaman, 2020). These studies are based on various organisational theories that support this relationship, namely agency theory (Jensen & Meckling, 1976), resource dependence theory (Pfeffer & Salancik, 1978) and stakeholder theory (Freeman, 1984). They also rely on social role theory to explain the different behaviours of men and women (Boulouta, 2013). Consequently, the theoretical framework that supports the present study consists of the four cited theories, which are outlined later.

The first of these theories, agency theory (Jensen & Meckling, 1976), is based on the idea that shareholders and company managers have different interests, which may lead to agency costs. Therefore, the theory highlights the critical task of management oversight by the board on behalf of shareholders. This task may be influenced by the characteristics of the board, such as managerial compensation and independence, and it contributes to reducing agency costs (Jensen & Meckling, 1976). Based on this theory, therefore, gender diversity, as a corporate governance feature that gives boards independence, should lead to better corporate performance in various areas such as CSR (Valls-Martínez, Cruz Rambaud, & Parra Oller, 2019).

The second theory, resource dependence theory (Pfeffer & Salancik, 1978), describes the existence of relationships between a firm and its environment that make the organisation to some extent dependent on the outside. The board of directors takes a leading role in minimising this dependence because, as well as establishing communication channels with external agents (Pfeffer & Salancik, 1978), its members bring essential resources from outside the firm, such as experience and advice (Hillman, Cannella, & Paetzold, 2000). Accordingly, the incorporation of women should lead to greater board diversity in terms of gender, thus providing a broader range of opinions that can enrich decision making and make it more effective (Uyar et al., 2020).

According to stakeholder theory (Freeman, 1984), an organisation must address the needs of its stakeholders, which in addition to shareholders, include other groups that affect and/or are affected by the organisation's business. To meet their expectations, firms must know what their needs are and must ensure that any strategies are oriented towards them. Therefore,

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given the greater orientation of women towards the welfare of stakeholders, García-Meca, García-Sánchez, and Martínez-Ferrero (2015) argue that encouraging a female presence on the board helps the board better represent stakeholders and is conducive to stakeholder satisfaction thanks to social practices (Kyaw, Olugbode, & Petracci, 2017).

Finally, social role theory (Eagly, 1987) suggests that people's behaviour differs according to gender, given that, through education, society indirectly shapes this behaviour from childhood (Wood, Christensen, Hebl, & Rothgerber, 1997). These gender differences are perceptible in various contexts. Specifically, in senior management, men and women have different leadership styles. Men are associated with a directive and authoritarian style, whereas women have a more democratic and participative style (Eagly & Johnson, 1990). In turn, the strategic focus also differs between genders. Several articles report that women are more concerned with social welfare than economic concerns (Ibrahim & Angelidis, 1995) and tend to adopt a protective attitude towards the environment (Wehrmeyer & McNeil, 2000). These differences mean that women's values are more in line with CSR. Therefore, gender diversity on the board should contribute to socially responsible practices (Boulouta, 2013).

Empirical review

One of the most commonly debated characteristics of corporate governance is board gender diversity (Veltri, Mazzotta, & Rubino, 2021). This characteristic has become particularly relevant since the various performance-related benefits of heterogeneous groups began to be investigated and confirmed (Harjoto, Laksmana, & Lee, 2015). For example, the inclusion of women on the board of directors can help push the orientation of business policies and practices towards social and environmental welfare (Naciti, 2019) due to women's different values and experiences with respect to those of men. These different values and experiences result in improved decision making and management capacity, including in relation to CSR (Boulouta, 2013).

Several studies have revealed the need to include women on the board of directors, showing that gender diversity positively influences engagement in CSR practices (Disli, Yilmaz, & Mohamed, 2022; Harjoto, Laksmana, & Lee, 2015; Mallin & Michelon, 2011). In Europe, this finding has been corroborated by several authors. For instance, using a sample of Spanish companies, Valls-Martínez, Cruz Rambaud, and Parra Oller (2019) found that gender diversity contributed to the inclusion of companies in the Dow Jones Sustainability Europe Index (DJSI Europe). Similarly, Coluccia, Fontana, and Solimene (2019) found that companies with a higher level of female representation on their boards considered CSR practices and disclosure more important, in line with the findings of Zahid et al. (2020). These findings have been corroborated by several studies of the banking sector, including those of Kiliç, Kuzey, and Uyar (2015) and Matuszak, Różańska, and Macuda (2019) in Turkey and Poland, respectively.

Nevertheless, the literature is not unanimous. Some studies suggest that gender diversity is not a differentiator between companies with different levels of CSR performance (Nguyen, Elmagrhi, Ntim, & Wu, 2021; Veltri, Mazzotta, & Rubino, 2021). Others have shown that gender diversity has a negative influence on CSR performance (Ardito, Dangelico, & Messeni Petruzzelli, 2021; Rahman, Zahid, & Khan, 2021). It has even been suggested that this relationship is not linear (Birindelli, Iannuzzi, & Savioli, 2019). It is also worth providing several possible explanations for these differences. Specifically, the effect of gender diversity on firm performance is highly heterogeneous, volatile and context-dependent (Hassan & Marimuthu, 2018). Accordingly, this influence would be conditioned by the level of female representation on the board of directors (Gallego-Sosa, Fernández-Torres, & Gutiérrez-Fernández, 2020) or the emergence of conflicts that worsen the board's decision making, stemming from the inclusion of women in male-dominated areas (Cox, 2011). Therefore, future studies should explore the factors that may condition the relationship between gender diversity and CSR performance. Such research would open a crucial line of inquiry to clarify the behaviour of this relationship.

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This review has so far focused on the evidence of the relationship between the presence of women on boards of directors and CSR in general. Given the scope of this research, a review of studies linking gender diversity with the adoption of SDGs in each of the five pillars of the 2030 Agenda is now presented.

Review of the research applied to the 5Ps of the 2030 Agenda

Given the holistic approach to CSR performance, it is important to consider a wide range of economic, social and environmental impacts of businesses, because much of the literature suggests that there is a positive effect only in certain specific areas of CSR (Boulouta, 2013). This situation motivated the present study and this discussion of the evidence of the influence of female board representation on each of the five pillars (or '5Ps'): *People*, *Planet*, *Prosperity*, *Peace* and *Partnership*. The 17 SDGs are grouped into these 5Ps (see Table 1), three of which correspond to the classic three dimensions of CSR, namely the social, environmental and economic dimensions.

First, focusing on the *People* pillar of the 2030 Agenda, which relates to the social area of CSR, social and philanthropic issues receive more attention from boards with greater gender diversity (Boulouta, 2013; Galbreath, 2011; Ibrahim & Angelidis, 1995). Likewise, companies with female board members are more committed to sponsoring and creating organisations that benefit the community (Bernardi & Threadgill, 2010) and are more supportive of charitable actions (Jia & Zhang, 2013; Williams, 2003). In the case of the banking sector, certain CSR measures that enable the achievement of SDGs 1 (No poverty) and 2 (Zero hunger), such as microfinance or lending to the agricultural sector, are more common in banks with women directors (Hartarska, Nadolnyak, & Mersland, 2014).

Another aspect of the *People* pillar, specifically SDG 5, is gender equality. Larrieta-Rubín de Celis, Velasco-Balmaseda, de Bobadilla, Alonso-Almeida, and Intxaurburu-Clemente (2015) showed that the presence of women directors positively influences the implementation of CSR practices related to achieving gender equality, such as remuneration, training and career development, and work–life balance measures. Kowalewska (2020) reported that women in less senior positions within the company benefit from the presence of women directors by earning higher salaries, which reduces wage gaps (Stainback, Kleiner, & Skaggs, 2016).

Second, regarding the *Planet* pillar, which relates to the environmental dimension of CSR, several studies have shown that women are more aware of social and environmental issues (Naciti, 2019) and are therefore more likely to act pro-environmentally (Shoham, Almor, Lee, & Ahammad, 2017). These arguments justify the fact that research focusing on this pillar has confirmed the positive influence of women directors on companies' environmental performance in various contexts, such as Europe (Birindelli, Iannuzzi, & Savioli, 2019; Kyaw, Olugbode, & Petracci, 2017; Orazalin & Mahmood, 2021). The environmental actions encouraged by the presence of women directors include strategies to mitigate climate change, such as lower consumption of water resources (García-Martín & Herrero, 2020) through SDG 6 (Clean water and sanitation) and greenhouse gas emissions (Nuber & Velte, 2021) through SDG 13 (Climate action). Similarly, women board members positively influence product responsibility (Pandey & Hassan, 2020) and the sustainable supply chain (Benjamin, Mansi, & Pandey, 2020). These CSR practices can be linked to SDG 12 (Responsible consumption and production).

Third, focusing on the *Prosperity* pillar, which refers to the economic dimension of CSR, the presence of women in senior positions contributes to the implementation of energy policies (Fraune, 2016) through SDG 7 (Affordable and clean energy). Likewise, gender diversity is considered a governance mechanism that contributes to SDG 8 (Decent work and economic growth) by improving financial performance and increasing economic profitability (Liu, Wei, & Xie, 2014). Internally, the different leadership styles of men and women directly affect workers. These stakeholders are especially relevant for doing business and may be better motivated by

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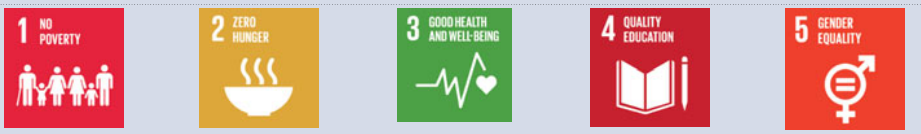
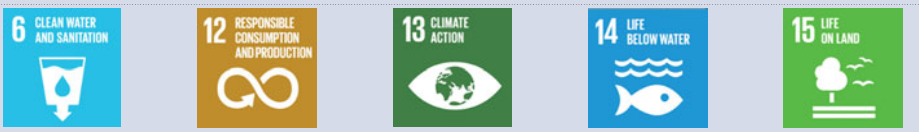
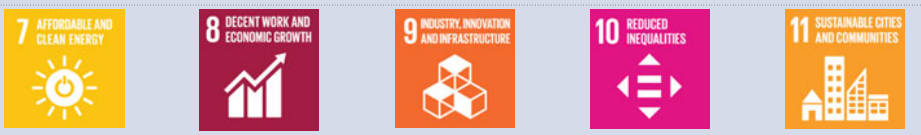
Table 1. 5Ps and their corresponding SDGs

P1 (People): End poverty and hunger and ensure that all human beings can fulfil their potential in a healthy environment	
SDGs	
P2 (Planet): Protect the planet from degradation so that it can support the needs of the present and future generations	
SDGs	
P3 (Prosperity): Ensure that all human beings can enjoy prosperous lives and that progress occurs in harmony with nature	
SDGs	
P4 (Peace): Foster peaceful, just and inclusive societies, free from fear and violence	
SDG	
P5 (Partnership): Create a revitalised Global Partnership for Sustainable Development, focused on the needs of the poorest and most vulnerable and with the participation of all countries and people	
SDG	

Source: Authors, based on United Nations (2015).

women board members through the creation of more satisfactory work environments (Bernardi, Bosco, & Vassill, 2006). Moreover, board gender diversity contributes to the implementation of equality policies and progressive, nondiscriminatory policies towards groups such as the lesbian, gay, transgender and bisexual (LGBT) community within the company, as well as the acceptance of these groups (Cook & Glass, 2016; Steiger & Henry, 2020). These aspects of CSR are closely aligned with SDG 8 (mentioned earlier), as well as SDG 10 (Reduced inequalities).

In relation to the *Peace* pillar, scholars such as Buitrago-Franco and Derbyshire (2020) have examined the role of women in promoting sustainable peace, as per SDG 16 (Peace, justice and strong institutions). These studies suggest that encouraging the presence of women is

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conducive to this SDG, with the participation of women crucial in forming regions of sustainable resources and progress towards sustainable peace. Another of the fundamental measures to achieve SDG 16 is fighting corruption, which women advisors can contribute to through greater corporate transparency in this area (Jaggi, Allini, Ginesti, & Macchioni, 2021).

Finally, the *Partnership* pillar refers to collaboration between the public sector, the private sector and civil society to achieve the goals of the 2030 Agenda and the SDGs. Stafford, Polonsky, and Hartman (2000) described partnerships for sustainability issues as strategic alliances that for-profit organisations form with 'pro-environmental' organisations. Post, Rahman, and McQuillen (2015) reported that women directors contribute to forming alliances for sustainability issues such as renewable energy. In summary, board gender diversity has multiple benefits for building towards the pillars of the 2030 Agenda, justified by the characteristics and values that make women different.

At the same time, it should be noted that this study uses a multi-theoretical approach, drawing on several theories to provide a range of reasons why the presence of women in management can be beneficial for an organisation in terms of CSR. Therefore, it is to be expected that the actions of women contribute to enhancing the work of the board of directors and, ultimately, it is the work of the board that defines the performance of the organisation in several areas, including CSR. This improvement can be explained by several reasons: the greater independence of the board (agency theory); its greater diversity, which translates into more effective decisions and therefore more efficient management of the dependence on external resources (resource dependence theory); the creation of a board that is more oriented to the company's diverse stakeholders (stakeholder theory); and the existence of a board consisting of members with different behaviours (social role theory), enriching it thanks to the presence of diverse leadership styles.

Consequently, based on these arguments, the following research hypotheses are tested:

Hypothesis 1.A Banks with greater female representation on the board of directors are more likely to be committed to the SDGs of the 2030 Agenda that aim to end poverty and hunger and to ensure that all people can develop in a healthy environment (Pillar 1).

Hypothesis 1.B Banks with greater female representation on the board of directors are more likely to be more intensely committed to the SDGs of the 2030 Agenda that aim to end poverty and hunger and to ensure that all people can develop in a healthy environment (Pillar 1).

Hypothesis 2.A Banks with greater female representation on the board of directors are more likely to be committed to the SDGs of the 2030 Agenda that aim to protect the planet (Pillar 2).

Hypothesis 2.B Banks with greater female representation on the board of directors are more likely to be more intensely committed to the SDGs of the 2030 Agenda that aim to protect the planet (Pillar 2).

Hypothesis 3.A Banks with greater female representation on the board of directors are more likely to be committed to the SDGs of the 2030 Agenda that aim to ensure that all humans can lead a prosperous life (Pillar 3).

Hypothesis 3.B Banks with greater female representation on the board of directors are more likely to be more intensely committed to the SDGs of the 2030 Agenda that aim to ensure that all humans can lead a prosperous life (Pillar 3).

Hypothesis 4.A Banks with greater female representation on the board of directors are more likely to be committed to the SDGs of the 2030 Agenda that aim to promote peace and justice (Pillar 4).

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Hypothesis 4.B Banks with greater female representation on the board of directors are more likely to be more intensely committed to the SDGs of the 2030 Agenda that aim to promote peace and justice (Pillar 4).

Hypothesis 5.A Banks with greater female representation on the board of directors are more likely to be committed to the SDGs of the 2030 Agenda that aim to create a global alliance for sustainable development (Pillar 5).

Hypothesis 5.B Banks with greater female representation on the board of directors are more likely to be more intensely committed to the SDGs of the 2030 Agenda that aim to create a global alliance for sustainable development (Pillar 5).

Sample and method

Sample selection

The sample for this study consists of the 50 largest banks in Europe by market capitalisation on 25 June 2021 (Refinitiv, 2021), having collected data for these banks for the period 2016–2020. Table 2 details the country representation of the selected companies. The sample consists of 19 countries, with Italy and the United Kingdom having the largest number of companies in the sample.

These banks were selected based on their classification as large and medium-sized companies by market capitalisation according to the Refinitiv (2021) platform. This category includes companies with a market capitalisation of more than USD 1 billion. Of the companies that met this condition on 25 June 2021, the top 50 were selected. These 50 banks were chosen because they had a market capitalisation of more than 3.8 billion USD, which corresponds to the 50th percentile of market capitalisation in the initial sample. This statistic was taken as a reference because it divided the initial sample into two subsamples: the 50% of banks with the highest market capitalisation, and the remaining 50%. The sample was separated this way because of the need to distinguish between firms by size in studies of CSR. Given that it is advisable to differentiate firms by size in studies of CSR, it made sense to divide the initial sample, which contained medium-sized and large firms, in this way to achieve a certain level of homogeneity amongst firms according to their size. Hence, the decision to select the largest companies can be justified by various arguments. First, these companies had greater data availability and representativeness within the sector. Regarding the first issue, within the European Union, Directive 2014/95/EU puts the spotlight on large firms by requiring them to present nonfinancial information in relation to social and environmental matters (European Commission, 2014), given the growing interest from stakeholders in knowing about these practices (Pizzi, Caputo, Venturelli, & Caputo, 2022). Second, the implementation of CSR initiatives, such as environmental initiatives, requires large-scale investment, and listed companies have better access to the necessary financial resources (Liao, Luo, & Tang, 2015).

Regarding the time frame, this period was selected because, at the time of conducting the study, it was only possible to collect SDG-related information from companies' sustainability reports for these years. This situation is due to the recent implementation of these SDGs, which only officially entered into force on 1 January 2016 (United Nations, 2015).

Variables

The variables selected for this study can be divided into two groups: those aimed at measuring the banks' level of commitment to the SDGs and those related to female representation on the board of directors. The variables in the first group were constructed based on data from the sustainability reports published by each bank on its corporate website. These data were gathered by the same

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Table 2. Number of banks by country

Country	Total	Percentage (%)
Austria	3	6
Belgium	1	2
Cyprus	1	2
Czech Republic	1	2
Denmark	1	2
Finland	1	2
France	3	6
Germany	2	4
Hungary	1	2
Ireland	2	4
Italy	7	14
The Netherlands	2	4
Norway	1	2
Poland	4	8
Russia	2	4
Spain	5	10
Sweden	4	8
Switzerland	3	6
United Kingdom	6	12
Total	**50**	**100**

Source: Authors, based on Refinitiv (2021).

researcher for the entire sample to avoid possible bias due to the use of different criteria and to limit subjectivity as much as possible. The gender variables were taken from the Thomson Reuters database (Refinitiv, 2021). The dichotomous variables *Dum3*, *Dum30* and *Dum40*, were constructed based on data from the same database.

The aforementioned groups of variables are now presented and explained in the same order. Table 3 provides the name and description of the SDG measures. Of the 17 variables used to measure commitment to the SDGs, some reflect whether or not a bank addresses the SDGs (Participation), whereas others relate to the intensity with which the SDGs are addressed (Intensity). The Participation variables are dichotomous, whereas the Intensity variables reflect the number of SDGs addressed and the proportion with respect to the total number of SDGs. In both cases, an overall measure (*SDG* and *IT_SDG*, respectively) is used. Then, a measure is provided for each of the five pillars (i.e., the 5Ps) of the 2030 Agenda (United Nations, 2015).

To produce these two groups of indicators, the starting point was to review the emerging literature on SDGs. In this literature, companies' commitment to SDGs has essentially been measured by dichotomous variables indicating whether or not a given company addresses any of the SDGs (Girón et al., 2020; Pillai et al., 2017; Rosati & Faria, 2019) or by the number of SDGs that the company intends to achieve (Ali et al., 2018; Avrampou et al., 2019; Cosma et al., 2020; Gallego-Sosa et al., 2021). Although both indicators are suitable ways of measuring companies' commitment to the SDGs, this study uses an extension of this form of measurement. Specifically, this study considers not only the adoption of SDGs overall but also the adoption

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Table 3. Description of SDG variables

	Label	Description
Participation	*SDG*	Dummy variable that takes the value 1 if at least one of the SDGs is addressed, and 0 otherwise
	PresPn	Dummy variable that takes the value 1 if the SDGs in P*n* are addressed, and 0 otherwise, where $n = 1, 2, 3, 4$ or 5, with each value of *n* corresponding to one of the 5Ps
Intensity	*IT_SDG*	Number of SDGs addressed
	IntensPn	Number of SDGs addressed for the corresponding P*n*, where $n = 1, 2, 3, 4$ or 5, with each value of *n* corresponding to one of the 5Ps
	Intens1Pn	Proportion of SDGs addressed in each P*n*, where $n = 1, 2, 3, 4$ or 5, with each value of *n* corresponding to one of the 5Ps

Source: Authors based on Gallego-Sosa et al. (2021), Girón et al. (2020) and Rosati and Faria (2019). Note: P1 consists of SDGs 1–5; P2, 6 and 12–15; P3, 7–11; P4, 16; P5, 17.

of SDGs in each of the aforementioned 5Ps because these are the pillars of the action strategy of the 2030 Agenda (United Nations, 2015). This is the first time that commitment to SDGs has been measured for each of these five critical areas.

To help readers understand the study aims and the steps taken to meet these aims, it is worth clarifying the approach used in this study to measure commitment to the 2030 Agenda. Such a commitment is considered to exist when a bank has expressly stated its decision to align its sustainability strategies with at least one of the SDGs and has designed actions to achieve the targeted SDGs. Moreover, the degree of commitment is considered to be greater when the number of SDGs included in the sustainability policies is also greater. Therefore, during the data collection process, reports were consulted for each bank each year to check the following items and thus determine the existence of a commitment to the SDGs:

- whether the firm declared that its strategy was aimed at targeting or achieving at least one of the SDGs;
- and whether the firm declared that it performed actions to achieve certain SDGs.

To illustrate this idea, Table 4 provides excerpts from the declarations that were taken as indications of the existence of commitment. These excerpts refer to actions by Banco Santander S.A. and Intesa Sanpaolo S.P.A. Specifically, they provide evidence of the commitment of these two banks to SDG 4 (Quality education), SDG 8 (Decent work and economic growth) and SDG 13 (Climate action).

Firms were considered to be committed to the 2030 Agenda if they declared that they had performed specific actions aimed at achieving targets corresponding to at least one of the SDGs. The intensity of this commitment varied depending on the number of SDGs that the bank addressed.

In this study, it was considered that achieving an SDG takes time and, very likely, requires many gradual actions, given that it is a dynamic process. This idea is supported by the existence of the Compass SDG guidelines, which show the steps that companies should follow to achieve the SDGs (Global Reporting Initiative, UN Global Compact, & World Business Council for Sustainable Development, 2015). The implication is that commitment is constantly evolving and that it begins from the very moment when the bank decides to align its sustainability strategies with the 2030 Agenda and to start taking actions to achieve the different SDGs. This idea is acknowledged by Kiefner, Mohr, and Schumacher (2022) in their measurement of the existence of commitment to the SDGs. However, it is to be expected that the number and intensity of actions by firms committed to the 2030 Agenda increase over time. Firms can thus broaden the range of SDG targets they address, thereby fostering higher standards of commitment.

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Table 4. Examples of declarations by Banco Santander S.A. and Intesa Sanpaolo S.P.A. regarding their commitment to the 2030 Agenda

SDG	Actions contributing to SDG	Bank
4	The Santander Universities programme helps universities and students prosper, promoting education	Banco Santander S.A.
	The 'Per Merito' initiative, the first unsecured credit line dedicated to all university students residing in Italy	Intesa Sanpaolo S.P.A.
8	Salary advances and other financial provisions, office equipment and healthcare supplies delivered to homes, and psychological support	Banco Santander S.A
	Flexible work extended to over 65,500 people with 'digital coaches' to support the switch to smart working and share best practices	Intesa Sanpaolo S.P.A.
13	We offset our all emissions from our operation, thus become carbon neutral	Banco Santander S.A.
	There was an increase in the number of green and circular loans granted	Intesa Sanpaolo S.P.A.

Source: Authors based on the 2020 sustainability reports of Banco Santander, S.A. and Intesa Sanpaolo S.P.A. (Banco Santander, 2021; Intesa Sanpaolo, 2021).

The following gender measures were selected from the literature on gender diversity in corporate governance and business performance.

- *Nwom* indicates the number of women on the board of directors. It was included in the study to quantify the presence of women on the board of directors of the analysed companies, given that the size of the group of women on the board could affect their influence. This rationale is supported by studies that suggest that the power of a minority group, as is usually the case with women on the board of directors, depends on the number of members (Kanter, 1977; Latané, 1981). Consequently, this variable has been widely used in studies of gender diversity in management (Bernardi & Threadgill, 2010; Fakoya & Nakeng, 2019). Studies have confirmed its positive influence on CSR performance (Ardito, Dangelico, & Messeni Petruzzelli, 2021; Cook & Glass, 2018; Glass, Cook, & Ingersoll, 2016) and the quality of sustainability reports (Zahid et al., 2020).
- *Pwom* is the percentage of women on the board of directors. This measure is one of the most frequently used in studies of gender diversity in corporate governance (Galbreath, 2011; Kyaw, Olugbode, & Petracci, 2017; Uyar et al., 2020), specifically in the banking sector (Farag & Mallin, 2017; García-Meca, García-Sánchez, & Martínez-Ferrero, 2015). It was included in the study to complement the previous measure. Simply quantifying the number of women on the board of directors is not enough. That is, it is vital to control whether the number of women means that they belong to a minority or a majority within the board of directors, given that majorities exert a greater influence than minorities within groups (Asch, 1951, 1955; Tanford & Penrod, 1984). Minorities are sometimes marginalised when they have a small presence within a larger group.
- *Dum3* is a dummy variable that takes the value 1 if there were at least three women on the board of directors, and 0 otherwise. It was included in the study because some studies drawing on critical mass theory (Kanter, 1977) suggest that there must be a critical mass of women on the board before their presence can make a noticeable contribution to company performance (Liu, Wei, & Xie, 2014; Torchia, Calabrò, & Huse, 2011). Specifically, a minimum of three is usually considered the number of women necessary to represent a substantial minority capable of influencing CSR performance (Yarram & Adapa, 2021).
- *Dum30* is a dummy variable that takes the value 1 if the proportion of women on the board of directors was at least 30%, and 0 otherwise. This variable was included in the study because of the need for a critical mass of at least 30% of women on the board (Isidro &

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Sobral, 2015; Joecks, Pull, & Vetter, 2013). Some studies also highlight the need for minimum representation of 30% of women so that gender diversity on the board can exert a positive influence on a company's economic performance (Joecks, Pull, & Vetter, 2013) and on a greater commitment to ethical and socially responsible practices (Isidro & Sobral, 2015).

- *Dum40* is a dummy variable that takes the value 1 if the proportion of women on the board of directors was at least 40%, and 0 otherwise. It was included in the study to analyse differences between companies under both criteria. It was based on the proposal by the European Parliament and Council, which establishes a minimum target of 40% of the least represented gender amongst the nonexecutive directors of listed companies (European Commission, 2012). This measure is quite novel and has scarcely been used (Gallego-Sosa, Fernández-Torres, & Gutiérrez-Fernández, 2020, 2021). Fernández-Torres, Gutiérrez-Fernández, and Palomo-Zurdo (2020) highlighted the importance of reaching a critical mass of women board members of at least 40% so that they can make a significant contribution to company performance, compared to companies with a share below this proportion.

Method

The method in this research is statistical inference through hypothesis testing for differences in means. A hypothesis test essentially consists of formulating a hypothesis about a population, which is then tested using a statistic that is calculated based on a sample of data. It is also possible to formulate hypotheses about two populations to compare them with each other, as is the case when testing hypotheses of differences in means. This procedure yields conclusions about the differences between the means of these populations instead of conclusions about the absolute values of the means (Newbold, Carlson, & Thorne, 2013).

In light of its usefulness in enabling the comparison of the means of two populations, this method was used to confirm the validity of the assumption that the arithmetic means of the SDG measures vary between banks with different levels of female representation on the board of directors. To do so, the initial sample was divided into two samples several times using different gender diversity criteria. This process created multiple pairs of samples where, within each pair, one sample consisted of observations for banks and years with a high degree of gender diversity (based on the given criterion in that particular case), whereas the other sample consisted of observations with a low degree of gender diversity. Next, the means of the SDG measures of the samples of each pair were compared based on their difference in the hypothesis test, thereby addressing the aim of the current study.

This method was suitable given the present research aim. It has also been used in the gender diversity and CSR literature to study the existence of differences between two heterogeneous groups, as in the current study. Examples include the research of Galbreath (2011) and Bose, Hossain, Sobhan, and Handley (2022), who used this method to study the existence of differences in relation to corporate sustainability between firms with at least one woman on the board and those with no women on the board.

The steps to apply the aforementioned procedure are now described. Five pairs of samples were formed by dividing the original sample using different criteria of female representation on the board. Given that there were five gender measures, a sample division criterion was established for each one. First, two pairs of samples were obtained using the 50th percentile for the number of female directors and the proportion of female directors (4 and .3333, respectively) in order to ensure that the samples were of a similar size. Thus, two samples were obtained for each gender measure. Sample X contained observations corresponding to companies and years for which a given gender measure did not reach the threshold, and Sample Y contained the remaining observations (i.e., those associated with the highest values of the gender diversity indicator). The sample was likewise divided for the measures *Dum 3*, *Dum 30* and *Dum 40*. In

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each case, Sample X contained observations for companies and years for which these variables took the value 0 (i.e., when the threshold of minimum female representation corresponding to the measure was not met), and Sample Y contained the remaining observations.

Subsequently, the null hypothesis (H_0) and alternative hypothesis (H_1) were defined. The provisional assumption was that the former was true. This hypothesis was then tested to determine whether the sample data provided sufficient evidence to reject it or to continue accepting it as true. Specifically, the testing was conducted using hypothesis testing for differences in means with an unknown population standard deviation (Newbold, Carlson, & Thorne, 2013). Thus, the hypotheses were defined as follows: H_0: $\mu_x - \mu_y = 0$; H_1: $\mu_x - \mu_y \neq 0$. Accordingly, the null hypothesis stated that the arithmetic means of Samples X and Y did not differ from each other (i.e., no difference in means), whereas the alternative hypothesis stated the opposite (i.e., difference in means).

Hypothesis testing was carried out for each of the SDG measures and the aforementioned sample pairs. This procedure thus ensured the robustness of the results by using multiple SDG indicators and various sample division criteria based on different gender diversity indicators.

Results and discussion

Sample description

Before performing the statistical inference analysis to respond to the study aims, the sample was characterised. The results are provided in Tables 5 and 6. These tables show descriptive statistics for the SDG and gender diversity measures, respectively.

First, Table 5 shows that, in 73.6% of the observations over the period of analysis, at least one SDG had been adopted. Of these, 63.2% corresponded to the SDGs associated with prosperity (*PresP3*), 60.8% to the SDGs associated with protecting the planet (*PresP2*), 58.4% to the SDGs associated with ending poverty and hunger and ensuring that all people can develop in a healthy environment (*PresP1*), 36.4% to the SDGs associated with creating a global partnership for sustainable development (*PresP5*) and 31.2% to the SDGs associated with promoting peace and justice (*PresP4*). These results reveal a substantially stronger commitment to SDGs from the first three pillars, namely ensuring that all human beings can enjoy a prosperous life (P3), progressing in harmony and protecting the planet from degradation so that it can support the needs of the present and future generations (P2) and ending poverty and hunger (P1). However, these three critical areas are not comparable with the last two (P4 and P5) because of the number of SDGs covered by each one. Five SDGs are covered by each of the pillars P1, P2 and P3, whereas only one is covered by each of the pillars P4 and P5. This discrepancy may affect both the commitment to the two groups of pillars and the differences between them.

Regarding the intensity measures, on average, the analysed banks aimed to achieve six SDGs out of a possible 17 (*IT_SDG*) over the period of the study. However, this value varied greatly, as reflected by the standard deviation of the measure (5.704), which was similar to the arithmetic mean, and the percentiles, which indicated a large difference between the banks with the lowest and highest commitment in terms of the number of SDGs targeted. Specifically, the lowest 25% of observations had a value of 0, whereas the highest 25% of observations targeted at least 11 SDGs. Complementing these data with the intensity for each of the 5Ps reveals that, approximately, of the average of six SDGs targeted, two were in P3 (*IntensP3*) and two were in P1 (*IntensP1*). Only 25% of the sample observations reflected commitment to SDGs in pillars P4 (*IntensP4*) and P5 (*IntensP5*), which relate to promoting peace and building partnerships for sustainable development, respectively. Therefore, prosperity (P3) was again found to be the pillar that was addressed most intensively. Specifically, according to the percentiles for *IntensP3*, 50% of the observations targeted more than two of the five possible SDGs in this pillar, and 25% of the observations targeted more than four (i.e., all of them). Together, these findings imply that, on average, almost

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Table 5. Descriptive statistics for SDG measures (2016–2020)

	Arithmetic mean	Standard deviation	Minimum	Maximum	25th percentile	50th percentile	75th percentile
SDG	.736	.441	0	1	0	1	1
PresP1	.584	.493	0	1	0	1	1
PresP2	.608	.489	0	1	0	1	1
PresP3	.632	.483	0	1	0	1	1
PresP4	.364	.482	0	1	0	0	1
PresP5	.312	.464	0	1	0	0	1
IT_SDG	6.136	5.704	0	17	0	6	11
IntensP1	1.784	1.783	0	5	0	1.5	3
IntensP2	1.432	1.577	0	5	0	1	2
IntensP3	2.236	2.019	0	5	0	2	4
IntensP4	.364	.482	0	1	0	0	1
IntensP5	.312	.464	0	1	0	0	1
Intens1P1	.286	.315	0	1	0	.3	.6
Intens1P2	.286	.315	0	1	0	.2	.4
Intens1P3	.447	.403	0	1	0	.4	.8
Intens1P4	.364	.482	0	1	0	0	1
Intens1P5	.312	.464	0	1	0	0	1

Source: Compiled by the authors based on each bank's sustainability report published on the respective corporate website. Number of observations = 250.

Table 6. Descriptive statistics for gender variables (2016–2020)

	Arithmetic mean	Standard deviation	Minimum	Maximum	25th percentile	50th percentile	75th percentile
Nwom	4.2019	1.9402	0	11	3	4	6
Pwom	.3152	.1093	0	.5384	.2500	.3333	.3809
Dum3	.7906	.4077	0	1	1	1	1
Dum30	.6372	.4819	0	1	0	1	1
Dum40	.2232	.4174	0	1	0	0	1

Source: Authors, based on Refinitiv (2021). Number of observations = 215.

50% of the SDGs in this pillar were adopted (44.7% according to *Intens1P3*), giving it the highest weighting of any of the five pillars. Finally, the data imply that although the banks show a commitment to the 2030 Agenda, they still have much work to do to ensure that it is implemented correctly.

Regarding the gender measures, Table 6 suggests that, on average, the boards of directors contained approximately four women (*Nwom*) between 2016 and 2020. Also, in 50% of the observations, the number of women directors was less than four, and in at least one company and year, there were no female board members. The data imply that, on average, women accounted for 31.52% of board members (*Pwom*), with 75% of the observations for this measure below 38.09%, according to the 75th percentile. Although gender parity seems to have been achieved in some cases (maximum 53.84%), it is far from common.

The results for the variable *Dum3* show that most boards had at least three female members over the period of study (79.06% of the observations). In many cases (63.72% of the observations), women accounted for at least 30% of board members (see *Dum30*), although this situation was radically different when considering a proportion of 40% (see *Dum40*). In only 22.32% of the observations of *Dum40*, women had at least 40% representation, which it should be recalled is the minimum representation established in the proposal of the European Parliament and Council (European Commission, 2012). Therefore, in many cases, this minimum representation of 40% has not been achieved, revealing the existence of a gender gap that has been observed in other studies of the European banking sector (Farag & Mallin, 2017; Gallego-Sosa et al., 2021).

Hypothesis testing

To respond to the research aims, Tables 7 and 8 present the results of the hypothesis testing for differences in means. As explained in the Method section, two pairs of samples were obtained using the median values of *Nwom* and *Pwom* (criteria 1 and 2, respectively). Table 7 shows the results for these two pairs of samples. Group X in each case contained the observations of companies and years for which the values of *Nwom* and *Pwom* were below the median for the sample set (4 and .3333, respectively). Group Y contained the remaining observations.

According to Table 7, the differences in means were negative in all cases. These results indicate that the averages for all SDG measures were higher in the samples with a higher representation of women on the boards in terms of both number of women (*Nwom*) and proportion of women (*Pwom*). However, it is important to consider the statistical significance of these differences. With the exception of P5 (*Partnership*), the differences in means were statistically significant for the remaining SDG measures for at least one of the two criteria.

We first discuss the results for criterion 1. The statistical evidence indicates that there were differences between banks with at least four women directors and those with fewer than four women directors in terms of both the decision to adopt at least one of the SDGs and the intensity with which these SDGs were adopted. The null hypothesis of equality of means was rejected at the 1% significance level in 14 of the 17 tests. Specifically, banks with greater female representation on the board were more committed to pillars 1 to 4 (*People*, *Planet*, *Prosperity* and *Peace*) of the 2030 Agenda. On average, the banks in the more gender-diverse sample (in terms of having at least four female board members) adopted approximately three more SDGs (see *IT_SDG*: mean difference = −2.5606), with the greatest difference in pillar 3 (see *IntensP3*: mean difference = −.9644).

For criterion 2, the null hypothesis was rejected at varying levels of significance (1%, 5% and 10%) in nine of the 17 tests. Accordingly, differences were observed between banks with less than 33.33% female representation and those with more than this proportion of female directors. These results indicate that banks with more gender-balanced boards are more committed to achieving at least one of the SDGs in pillars 1–3 and address more SDGs in the *Planet* (P2) and *Prosperity* (P3) pillars.

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Table 7. Hypothesis testing for differences in means for the SDG variables according to *Nwom* and *Pwom* values

	Group criterion (X and Y)	Mean difference	*t*-student
SDG	1	−.2957***	−5.1299
	2	−.2788***	−4.7342
PresP1	1	−.3042***	−4.7271
	2	−.1861***	−2.7928
PresP2	1	−.2646***	−4.1127
	2	−.2191***	−3.3458
PresP3	1	−.2719***	−4.2927
	2	−.1873***	−2.8790
PresP4	1	−.2021***	−3.1429
	2	−.1006	−1.5344
PresP5	1	−.0480	−.7552
	2	−.0433	−.6797
IT_SDG	1	−2.5606***	−3.3549
	2	−1.4491*	−1.8515
IntensP1	1	−.7790***	−3.2488
	2	−.3277	−1.3316
IntensP2	1	−.5679***	−2.6936
	2	−.4243**	−1.9810
IntensP3	1	−.9644***	−3.5699
	2	−.5547**	−2.0052
IntensP4	1	−.2021***	−3.1429
	2	−.1006	−1.5344
IntensP5	1	−.0480	−.7552
	2	−.0433	−.6797
Intens1P1	1	−.1558***	−3.2488
	2	−.0656	−1.3316
Intens1P2	1	−.1136***	−2.6936
	2	−.0849**	−1.9810
Intens1P3	1	−.1929***	−3.5699
	2	−.1109**	−2.0052
Intens1P4	1	−.2021***	−3.1429
	2	−.1006	−1.5344
Intens1P5	1	−.0480	−.7552
	2	−.0433	−.6797

Hypothesis: H_0: $\mu_x - \mu_y = 0$; H_1: $\mu_x - \mu_y \neq 0$.
Source: Compiled by the authors based on each bank's sustainability report published on the respective corporate website and Refinitiv (2021). Criterion 1 (X: *Nwom* < 4; Y: *Nwom* ⩾ 4) and criterion 2 (X: *Pwom* < .3333; Y: *Pwom* ⩾ .3333). *, ** and *** indicate rejection of the null hypothesis of equal means at the 10%, 5% and 1% significance levels, respectively. Observations: *Nwom* < 4 = 103, *Nwom* ⩾ 4 = 112, *Pwom* < .333 = 99, *Pwom* ⩾ .3333 = 116.

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Table 8. Hypothesis testing for differences in means for the SDG variables according to *Dum3*, *Dum30* and *Dum40* values

	Group criteria (X and Y)	Mean difference	*t*-student
SDG	3	−.4194***	−5.2138
	4	−.3350***	−5.1676
	5	−.1451**	−2.3206
PresP1	3	−.3294***	−4.1235
	4	−.2373***	−3.4079
	5	−.0675	−.8477
PresP2	3	−.3368***	−4.1848
	4	−.2811***	−4.0918
	5	−.0582	−.7412
PresP3	3	−.3382***	−4.1779
	4	−.2364***	−3.4345
	5	−.0281	−.3592
PresP4	3	−.1520**	−2.0273
	4	−.1839***	−2.8215
	5	−.0673	−.8312
PresP5	3	−.0647	−.8522
	4	−.0703	−1.0768
	5	.0067	.0883
IT_SDG	3	−2.7706***	−2.7972
	4	−2.2556***	−2.7814
	5	.4591	.5325
IntensP1	3	−.8045***	−2.6509
	4	−.6209**	−2.4488
	5	.3767	1.4553
IntensP2	3	−.5502**	−1.9493
	4	−.5977***	−2.7118
	5	.0492	.2177
IntensP3	3	−1.1874***	−3.6432
	4	−.7885***	−2.7608
	5	.0808	.2463
IntensP4	3	−.1520**	−2.0273
	4	−.1839***	−2.8215
	5	−.0673	−.8312
IntensP5	3	−.0647	−.8522
	4	−.0703	−1.0768
	5	.0067	.0883
Intens1P1	3	−.1609***	−2.6509

(*Continued*)

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Table 8. (*Continued.*)

	Group criteria (X and Y)	Mean difference	*t*-student
	4	−.1241**	−2.4488
	5	.0754	1.4553
Intens1P2	3	−.1100*	−1.9493
	4	−.1196***	−2.7118
	5	.0100	.2177
Intens1P3	3	−.2375***	−3.6432
	4	−.1577***	−2.7608
	5	.0161	.2463
Intens1P4	3	−.1520**	−2.0273
	4	−.1839***	−2.8215
	5	−.0673	−.8312
Intens1P5	3	−.0647	−.8522
	4	−.0703	−1.0768
	5	.0067	.0883

Hypothesis: H_0: $\mu_x - \mu_y = 0$; H_1: $\mu_x - \mu_y \neq 0$.
Source: Compiled by the authors based on each bank's sustainability report published on the respective corporate website and Refinitiv (2021). Criterion 3 (X: *Dum3* = 0; Y: *Dum3* = 1), criterion 4 (X: *Dum30* = 0; Y: *Dum30* = 1) and criterion 5 (X: *Dum40* = 0; Y: *Dum40* = 1). *, ** and *** indicate rejection of the null hypothesis of equal means at the 10%, 5% and 1% significance levels, respectively. Observations: *Dum3*(0) = 45, *Dum3*(1) = 170, *Dum30*(0) = 78, *Dum30*(1) = 137, *Dum40*(0) = 167, *Dum40*(1) = 48.

Table 8 shows the results for criteria 3, 4 and 5. In each case, the sample was divided into two groups depending on whether each company had minimum female representation (Y) or not (X) on the board. For criterion 3, this minimum was three women directors (*Dum3*), for criterion 4, it was 30% women (*Dum30*), and for criterion 5, it was 40% women (*Dum40*).

All statistically significant differences in the means of the SDG measures were negative, which means that the means were higher for the samples with higher values in the gender diversity measures. This statistical significance also held for criteria 3 and 4, with the exception of one case for criterion 5 and the tests with the variables of the *Partnership* pillar (P5). Therefore, the evidence suggests that having at least three women on the board or having at least 30% female representation on the board distinguishes banks with superior performance in terms of sustainability, measured using the SDGs from pillars 1 to 4. Banks with at least three women directors had 41.94% more observations in which at least one SDG had been adopted than banks with fewer than three female directors (see *SDG*, criterion 3). In addition, banks with at least three women directors targeted, on average, around three more SDGs than banks with fewer women directors (see *IT_SDG*: mean difference = −2.7706). The most widely adopted SDGs were those in the *Prosperity* pillar (P3), as shown by the difference of 1.1874 (*IntensP3*).

With the exception of pillar 4, the significant differences in means were noticeably higher in the analysis based on criterion 3. This finding implies that when a third woman joins the board, the difference in terms of commitment to the SDGs becomes more pronounced than when female board representation reaches 30%.

These results highlight several issues. First, banks with greater female representation on the board were found to be more committed to the SDGs in most of the five pillars, specifically ending poverty and hunger (P1), protecting the planet (P2), ensuring prosperity (P3) and promoting peace (P4). These results are robust, given that they were corroborated using four of the five

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criteria for establishing gender diversity. Specifically, the only case in which differences in SDG commitment were not found was between banks with female board representation of at least 40% and those below this threshold. Moreover, the greatest difference in terms of the number of implemented SDGs was for pillar 3.

These results are consistent with those of previous studies, which have shown that companies with greater female representation on the board of directors are more committed to CSR (Pucheta-Martínez, Olcina-Sempere, & López-Zamora, 2020; Valls-Martínez, Cruz Rambaud, & Parra Oller, 2019) and the SDGs (Rosati & Faria, 2019). Furthermore, this commitment can be observed in each specific dimension of CSR (Cook & Glass, 2018; Naciti, 2019), each related to one of the 5Ps. In the social dimension, which is comparable to the *People* pillar (P1), banks with a greater female representation on the board were found to have better performance in terms of charitable actions (Williams, 2003), sponsorship and the creation of organisations that benefit the community (Bernardi & Threadgill, 2010), as well as their contribution to the professional development of women (Larrieta-Rubín de Celis et al., 2015). In the environmental dimension, which is related to the *Planet* pillar (P2), Birindelli, Iannuzzi, and Savioli (2019), Muhammad and Migliori (2022), Orazalin and Mahmood (2021) and others have reported the positive influence of women directors on environmental performance, given their contribution to reducing water resource usage (García-Martín & Herrero, 2020) and carbon emissions (Nuber & Velte, 2021). Regarding the economic dimension, which is associated with the *Prosperity* pillar (P3), Fraune (2016) reported the influence of gender diversity on the implementation of energy policies, and Liu, Wei, and Xie (2014) suggested that women on the board of directors can contribute to companies' superior economic performance.

The finding regarding the differences for the *Peace* pillar (P4) is consistent with the conclusions of Buitrago-Franco and Derbyshire (2020), who reported that women contribute to progress towards sustainable peace.

The differences in CSR performance that were observed once there was at least 30% female representation on the board and once there were at least three women board members provide support for critical mass theory. Similar results have been found by Yarram and Adapa (2021). The effect of reaching a critical mass of women can result in philanthropic undertakings (Jia & Zhang, 2013), environmental actions (Muhammad & Migliori, 2022; Post, Rahman, & Rubow, 2011; Shoham et al., 2017) and better economic performance (Liu, Wei, & Xie, 2014), which are included in pillars P1, P2 and P3, respectively. Regarding the absence of significant differences in means in the commitment to the 2030 Agenda between banks with at least 40% female representation and those below this threshold, this result is consistent with the findings of Gallego-Sosa, Fernández-Torres, and Gutiérrez-Fernández (2020). They reported that reaching this minimum proportion of female representation does not contribute to better environmental performance. They justified their findings by citing the possible existence of resistance that inhibits the voice of women on the board.

However, despite confirming the findings of prior research, it is worth highlighting the uniqueness and value of this study with respect to previous ones. First, there are no previous studies focused exclusively on the relationship between board gender diversity and commitment to the SDGs for either firms in general or the banking sector in particular. Although some studies have confirmed a positive relationship between the presence of women on the board and the drafting of reports on the adoption of SDGs, such as that of Girón et al. (2020), the analysis has not focused on gender diversity. Consequently, this study addresses the issue of gender in greater depth and more exhaustively. In addition, this study takes a novel approach by distinguishing between the five pillars of the 2030 Agenda in the analysis. It was thus possible to discover the association between the degree of gender diversity and the commitment with each of these specific areas, with the results showing the importance of this distinction.

Moreover, the analysis presented in this paper involved a greater number and range of indicators of commitment to SDGs than is commonly found in studies about the adoption of the

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2030 Agenda (Pizzi, Rosati, & Venturelli, 2021; Rosati & Faria, 2019). This feature is relevant in that it ensures that the results are robust.

In addition, the results presented here reveal discrepancies with some studies that suggest that the number of women on the board of directors is not a differentiating factor in terms of company donations (Williams, 2003), environmental performance (Bernardi & Threadgill, 2010) or efficient energy consumption in the banking sector (Fakoya & Nakeng, 2019).

In conclusion, support was found for four of the five proposed hypotheses (Hypotheses 1, 2, 3 and 4). This support comes from the results of the analysis, which show differences in commitment to the SDGs in pillars 1–4 (participation and intensity) between banks with different degrees of female board representation.

Conclusions

This paper meets its aim of determining whether there are differences in commitment to the SDGs and the intensity of this commitment between companies with different levels of female representation on the board of directors. Hypothesis testing for differences of means was carried out for a sample of the 50 largest European banks over the period 2016–2020. This paper is novel in terms of its grouping of SDG measures into pillars and the evidence that, in the banking sector, board gender diversity is a differentiating factor between banks with different levels of commitment to the 2030 Agenda.

The results provide robust evidence that, on average, banks with greater female representation on the board are more committed to the 2030 Agenda and are more intense in their commitment. Specifically, they are more engaged with SDGs that aim to end poverty and hunger (P1), protect the planet for the present and future generations (P2), achieve prosperity for all human beings and progress in harmony with nature (P3) and promote peace and justice (P4). The greatest degree of performance differentiation of these organisations is in relation to pillar P3.

Thus, the results support the theoretical arguments justifying the hypotheses tested in this study. These hypotheses were formulated based on agency theory, resource dependence theory, stakeholder theory and social role theory, which were discussed earlier. These theories suggest a possible influence of gender diversity on business performance and differences in leadership styles between genders. Furthermore, these results support critical mass theory, given that CSR differences were observed between companies with at least three women or 30% of female representation on the board and those below these thresholds. This finding implies that achieving minimum representation may be crucial for this minority group to be taken into consideration and therefore for female talent to make a contribution instead of going unnoticed.

Therefore, given the importance of implementing the 2030 Agenda as the only way to ensure a sustainable future for everyone, this study has important theoretical and practical implications. These practical applications are relevant for all agents involved, namely governments, the private sector and civil society. Regarding the theoretical implications, this study extends the gender diversity and CSR literature in two important ways. First, it broadens the spectrum of measurement approaches for measuring CSR through the SDGs, highlighting the need to distinguish between each of the pillars of the 2030 Agenda. Second, the evidence provided by the study opens an interesting new path. This path must be addressed in relation to the banking sector, a sector that has received scant attention in studies of SDGs, has low board gender diversity and yet is of vital importance for the performance of economies. This study shows that female board representation is a differentiating factor in terms of commitment to four of the five pillars of the 2030 Agenda. It thus highlights the need for further insight into the role of gender diversity in enabling firms in general and banks in particular to target the achievement of the SDGs and ultimately meet these goals.

Regarding the practical implications, given the capacity of the banking sector to lead economies towards a commitment to sustainability, gender diversity on the boards of banks should be encouraged in order to strengthen their commitment to the SDGs. Thus, in their actions,

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governments and institutions should be aware that the talent of women is being underused in the upper echelons of the corporate hierarchy. They must also be aware that this underuse of female talent has consequences not only for the financial performance of firms but also for their CSR actions, which can ultimately compromise the progress in sustainable development that countries should be targeting. Therefore, governments and decision makers should enforce regulations that ensure effective gender equality through actions in various areas such as the family, education and employment. Special attention should be paid to employment to address discrimination in climbing the corporate ladder. Second, managers must be aware of the barriers that women face in their professional development and of the consequences that these barriers can have on an organisation's CSR performance. It is essential that they adopt measures to eradicate them. Therefore, companies should adopt human resource policies based on the principle of equal opportunities for genders. These policies should address all areas that affect staff at all levels of the organisation. Examples include talent capture, selection processes, training, compensation, work–life balance and professional promotions. At the same time, civil society must play an active role in demanding that governments and companies work towards the definitive elimination of gender inequalities, not only as a matter of justice but also because of the urgent need to promote a sustainable future.

Despite its contributions, this research has several limitations. First, complexity in the data collection led to limitations on the sample size. Due to this complexity and the focus on the SDG pillars, even though the SDG measures were novel with respect to previous studies, this study only considered whether banks were committed to the 2030 Agenda and the number of SDGs (overall and for each pillar) they had adopted, ignoring the number of initiatives they had taken to achieve the SDGs. In addition, although the method was appropriate for the purpose of meeting the research aims, it did not enable the testing of causal relationships between the gender and CSR variables. Therefore, in the future, it would be advisable to increase the sample and investigate other CSR measures related to the SDGs to quantify the contributions of banks in each SDG, in addition to what appears in the annual sustainability reports. Finally, this research could be extended by applying econometric methods to confirm the existence of causality between the variables considered in the study.

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