

# Exploring the Relationship between Corporate Social Responsibility and Sustainable Development from the Gender Structure of Board of Directors: An Empirical Analysis of the Two-Stage Least Square Method

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## Abstract

More and more corporates are aware of the need to pursue sustainability and must implement corporate social responsibility (CSR) to meet the triple bottom line of economic, social and environmental benefits. However, only about 50% of Taiwan's top 100 companies are concerned about the sustainable development of the company! Why is this so? Perhaps the key is that the role and function of the board has not been played? This study considers the development of the direction of the board of directors' corporate development strategy, and the gender structure of the board of directors is the development direction of the company. Based on this, the main research question of this study is: Does the gender structure of the board of directors affect the practice of CSR, which in turn affects its sustainable development? To find out the answer to the research question, the study collected the data, 2007-2017 Top 30 Corporate Citizenship Survey, from CommonWealth and the Taiwan Economic Journal to build a sample of 11 years pooled data; At the same time, due to CSR and corporate sustainability two of them may have endogenous problems. Therefore, this study applies the two-stage least-square (2SLS) method for empirical analysis, in order to truly reflect the facts. The results of the study show that: (1) Corporate governance, corporate commitment, social participation and environmental sustainability are positively related to the sustainable development of corporates. (2) The gender structure heterogeneity of the board of directors will positively affect the degree of social participation, which in turn affects the sustainable development of the corporates. (3) The gender structure of the board of directors was negatively affect the degree of sustainability of the corporate environment, and then will affect the sustainable development of the corporates. The findings of (2) and (3) conveyed that the gender structure of the board of directors is an antecedent variable between corporate social responsibility and sustainable development, but their direction is different. Above findings have far-reaching management implications.

**Keywords:** Sustainable Development, Corporate Social Responsibility, Gender Structure of Board Directors, Two-Stage Least Square

## 1. Introduction

Sustain means to “continue”. For corporate sustainability, how to maintain or prolong the production and use of resources in an environment with limited resources, so that natural resources can be used by human beings forever and will not affect the production and life of future generations of human beings due to depletion. To achieve the above goals, corporates should act as corporate citizens to fulfill social responsibilities, perform various tasks to promote social progress, improve the environmental damage that may be caused by the production process of corporates, and promise to protect the rights and interests of all stakeholders (Dyllick and Hockerts, 2002). Since then, many scholars have pointed out that in

order to achieve sustainable development of a corporate, it is not only about how to maximize the profit of the corporate but must adhere to the triple baseline of economic sustainability, environmental sustainability and social sustainability, and proceed from the environmental perspective. To drive economic growth and social progress is a feasible path for corporates to achieve sustainable development (Arowoshegbe and Emmanuel, 2016; Arslan and Kisacik, 2017).

It is worth noting that technology progress has led to the booming of industrial production activity. Meanwhile, human's lifestyle, due to the abundance of material life, has headed towards the vicious cycle of mass production, massive consumption and the creation of massive waste; consequently, environment was polluted, resource was greatly reduced, and eventually, generation sustainability of human beings was endangered. Due to its insufficient natural resource, frequent visit of natural disaster and its long-term reliance of energy supply on import, Taiwan has more urgent need on the pursuit of sustainable development as compared to other countries. Therefore, when a corporate was pursuing sustainability, how to reduce the amount of waste created, how to turn the waste into resource and how to reduce the hazard of the waste was a quite important task of a corporate. Moreover, how to create a harmonious cycle for the materials between economic system and natural ecological system, how to maintain a natural ecological balance, how to get a tradeoff between environmental protection and economic growth, between environmental protection and social development and between social development and economic growth, all the above were indispensable corporate social responsibility (CSR) of a corporate, and were also necessary conditions for a corporate to step into sustainable development (Tukker, 2004; Yunus, Bertrand, and Laurence, 2010; Bocken, Short, and Evans, 2014).

To create the maximal benefit for shareholders was always the basic cognition of corporate social responsibility. As different topics such as "corporate governance", "corporate commitment", "Social participation" and "environmental sustainability" were proposed, corporate social responsibility has jumped off the meaning of pure satisfaction of the benefit of shareholders, instead, three bottom lines such as "sustainable economics", "sustainable society" and "sustainable environment" must be tried to be reached as a keyway for a corporate to step into sustainable development. Although the concepts of social responsibility and sustainable development had been promoted in Taiwan for a while, yet from real cognition to the fulfillment of social responsibility was not necessary a loading, instead, it might be business opportunity or a chance for profit improvement to create the sustainable development of a corporate, however, the latter case was rarely seen. Under such situation, not only each corporate cannot hide itself from such trend, it must also act as a leader and promoter for fulfilling social responsibility and for leading the corporate to move towards the direction of sustainable development (Oertwig et al., 2017). Therefore, it was thought in this study that when a corporate was heading towards sustainable development, to fulfill social responsibility was no longer a problem of "should or should not", instead, it was a problem of "how to do it". Unfortunately, among top 100 corporates in Taiwan, only about 50% concerned about sustainable development of a corporate! How come the result is so?

Whether a corporate has fulfilled its social responsibility or whether a corporate has pursued sustainable development, the key was on the highest decision-making department of the corporate: the Board of Directors (Galeitzke et al., 2016). In the early stage, literature regarding board of directors surrounded around the influence of the operation of board of

directors on corporate business (e.g., Ibrahim and Angelidis, 1994; Van and Ingley, 2003); however, recently, the topics related to gender structure of board of directors had attracted the attention from many scholars (e.g., Niederle and Vesterlund, 2007; Croson and Gneezy, 2009; Gul, Hutchinson, and Lai, 2013; Post and Byron, 2015). In this study, it was thought that the board of directors had an important role of making the development direction and strategy of a corporate, therefore, whether a corporate has fulfilled social responsibility or whether a corporate has headed towards sustainable development, the key is on the structure of directors of the board of directors, especially the gender structure of the directors.

In this study, it was proposed that the heterogeneity of gender structure of board of directors can bring innovative thinking, more diversified viewpoints, and methods to solve problems to a corporate, consequently, it can affect the discussion process and decision making of the board of directors. Therefore, the major research topic of this study was: Will the gender structure of the board of directors affect the fulfillment of corporate social responsibility and in turn affect its sustainable development? In other words, the gender structure of directors of the board of directors might be the antecedent variable of the influence of corporate social responsibility on corporate's sustainable development. To find out solutions for the research topics, next, summarization and deduction will be conducted on literature regarding the gender structure of directors of the board of directors, corporate social responsibility and corporate's sustainable development; meanwhile, related research hypotheses will be proposed for empirical study.

## **2. Literature Discussion and Hypothesis Establishment**

The gender structure of directors of board of directors meant by this study was the level of heterogeneity of gender structure of directors. Corporate social responsibility included four variables such as "corporate governance", "corporate commitment", "Social participation" and "environmental sustainability". Corporate sustainable development lays its foundation on triple bottom lines of "sustainable economics", "sustainable society" and "sustainable environment". In the followings, discussions will be based on the perspectives of agency theory, organizational demography and resource dependence theory.

### **2.1 Gender structure of director of board of directors, corporate governance and corporate sustainable development**

The gender structure of the board of directors is critical to the direction of business development. Numerous studies have pointed out that female directors play a key role in boardroom supervision, decision-making participation, or communication and coordination with the external environment (Carter et al., 2003; Harjoto, Laksmana, and Lee, 2015; Post and Byron, 2015). Robinson and Dechant (1997) pointed out that the gender composition of the board of directors is related to the leadership style and decision-making mode of the corporate. Other studies have pointed out that the more heterogeneous the gender composition of board directors, the more innovative their approach to decision-making and implementation strategies will be, and will bring new directions for the board (Pelled, 1996; Van and Ingley, 2003; Harjoto, Laksmana, and Lee, 2015); more studies have found that the more heterogeneous the gender structure of the board of directors, the more the market value of the company will increase, which will attract the attention of investors and promote the overall performance of the company (Robinson and Dechant, 1997; Tyson, 2003; Bear, Rahman, and Post, 2010; Joecks,

Pull, and Vetter, 2013). Therefore, the importance of gender structure of directors of board of directors can be easily seen.

Corporate governance is a part of corporate social responsibility. It has two meanings: in a narrow sense, corporate governance refers to a system of checks and balances that owners exercise over operators; in a broad sense, corporate governance is defined by a set of formal or informal internal or external mechanisms. A system or mechanism to coordinate the interests of a company and all stakeholders (shareholders, creditors, suppliers, employees, government, community). From the perspective of agency theory, many studies have pointed out that the board of directors is the main body of the agency relationship between owners and managers, and it is related to the direction and quality of the company's business decisions (e.g., Core et al., 2006; Hillman, Nicholson, and Shropshire, 2008). In addition, based on the perspective of organizational demography, some studies have pointed out that the more heterogeneous the gender structure of the board of directors, the higher the independence of the board of directors, the more effective the supervision of managers and the implementation of corporate governance mechanisms (Hillman and Dalziel, 2003; Carter, Simkins, and Simpson, 2003; Shaikat, Qiu, and Trojanowski, 2016). Kramer, Konrad, and Erktud (2013) also pointed out that the more gender-heterogeneous board directors are, the more they tend to care about the rights and interests of stakeholders, and the more they can play the role of supervising the board of directors, thereby influencing the decision-making direction of the board of directors. The gender structure of the board of directors is related to the degree of perfect corporate governance.

Corporate sustainability is the core value of a corporate. Perfect corporate governance is the cornerstone of business operation and a necessary condition for corporates to move towards sustainable development (Vernadat, 1996; Campbell and Minguez, 2008). In order to enhance the value of sustainable development of corporates, we believe that corporates should improve the transparency of information, provide effective, useful and timely information, and strengthen communication with stakeholders. In addition, corporate governance is an important foundation for a sound capital market, and it is also the main key to attracting investors to continue to invest. Therefore, corporates should actively promote various reforms in corporate governance to enhance the international competitiveness of my country's capital market in order to facilitate sustainable development.

Based on the above three paragraphs, hypothesis 1 was set up for this study.

**Hypothesis 1: The more heterogeneous the gender composition of the board of directors, the better the corporate governance will be, and the more likely the corporate will move towards sustainable development.**

## **2.2 Gender structure of directors of board of directors, corporate commitment and corporate sustainable development**

Corporate commitment is one of the core acts of practicing corporate social responsibility. It refers to the things that the corporate promises to the public, mainly including, establishing a talent training system, building a bridge of communication with stakeholders, creating a happy workplace ecology, providing an education system for whole-person upward development, adopting a policy of listening to employees Diversified autonomous learning environment, creating a stable and stimulating environment for talent retention, etc. Some studies have pointed out that if a company can fulfill its promises to its stakeholders, it will be beneficial to

the improvement of the company's market value and its goodwill (Tacheva and Huse, 2006; Apesteguia, Azmat, and Iriberry, 2012).

From the perspective of organizational demography, many studies have found that the more heterogeneous the gender composition of board directors, the more concerned about the rights and interests of stakeholders (Carter, Simkins, and Simpson 2003; Adams and Ferreira, 2009); female boards are more ethical Standard (Bear, Rahman, and Post, 2010; Gul, Srinidhi, and Tsui, 2011); female directors tend to build more commitment to stakeholders than male directors (Gul, Hutchinson, and Lai, 2013); the more heterogeneous the gender of the board of directors, the more diverse the views of the board's decision-making and discussion, and the richer the content of the discussion proposals (Farrell and Hersch, 2005). More research has shown that female directors are more open to listening to other speakers than male directors, and they are more interested in fulfilling corporate commitments related to various stakeholders (Bear, Rahman, and Post, 2010; Hafsi and Turgut, 2013).

Corporate commitment is an important part of social sustainability. In the process of pursuing sustainable development, corporates should undertake to achieve the following: implement and improve corporate governance; care for the environment; maintain integrity with stakeholders; promote employee well-being and provide a safe and healthy working environment; meet social needs and Giving back to the society, we are committed to enhancing the relationship with customers, employees, investors, government, third-party manufacturers, communities and other stakeholders...etc. At the same time, in response to the above commitments, corporates should regularly review the status of achievement, so as to gradually achieve sustainable commitments.

Based on the description in this subsection, this study believes that the more heterogeneous the gender structure of the board of directors, the higher the degree of corporate commitment, and the more favorable it is for the company to move towards sustainable development. Therefore, hypothesis 2 was set up for this study:

**Hypothesis 2: The more heterogeneous the gender composition of board directors, the higher the level of corporate commitment, and the more likely the corporate will move towards sustainable development.**

### **2.3 Gender structure of directors of board of directors, social participation and corporate sustainable development**

Social participation is the most accessible aspect for companies to do CSR. Social participation contributes to a corporate voluntarily, participates in community work, participates in social operation, interacts with social members, and enhances the corporate's own growth to achieve self-realization. Good social participation will generate emotional connections among the masses, thereby enhancing their own content and strengthening the company's shaping of its values. A simple one-time donation of money or materials is only a "basic plan". To achieve deeper social participation, companies must have a longer-term strategy to respond to community needs. Therefore, social participation refers to long-term and continuous involvement in social issues, creating a CSR atmosphere, exerting social nurturing power, etc.

Many organizational demography studies have pointed out that the gender heterogeneity of corporate board directors is closely related to social participation. The proportion of women

on the board of directors not only affects the performance of the company, but also has a different impact on social participation. response (Terjesen, Sealy, and Singh, 2009; Gul, Srinidhi, and Ng, 2011). Women directors play a key role in decision-making or communication and coordination with investors, the media, the public and other external environments on the board of directors (Harjoto et al., 2015; Post and Byron, 2015). Garcia et al. (2010) found that the more heterogeneous the gender structure of the board of directors, the higher the company's contribution to society, which prompted the company to expand social welfare activities, promote various project capabilities and corporate social responsibility, and improve overall performance. Another study pointed out that the more heterogeneous the gender structure of the board of directors, the richer the human capital of the corporate, and the higher the willingness of the corporate to participate in social issues, which will bring more impetus for sustainable development (Tyson, 2003; Adams and Ferreira, 2009; Harjoto, Laksmana, and Lee, 2015).

Social participation is a specific action for a corporate to practice social responsibility, and it is the nutrient that a corporate must invest in its sustainable development. With the rise of the concept of global sustainable development, corporates can no longer only pursue profit as their only business goal. They should give back to the society by actively participating in charitable actions, educational programs, and social work, allocate resources in the most perfect way, and give full play to Positive social influence, and then create sustainable value of the corporate. In essence, the success of a corporate comes from the support of the society. When a corporate is successful, it must be taken from the society, used for the society, and contributed with the sustainable spirit of running the corporate in order to expand and give back to the society. However, will the management policy of the board of directors of the company incorporate the management philosophy of giving back to society? Based on the findings of the organizational demography study cited in the previous paragraph, the board management policy may be determined by the state of the gender composition of the board directors? Based on this, this study proposes Hypothesis 3:

**Hypothesis 3: The more heterogeneous the gender composition of the board of directors, the higher the degree of social participation, and the more likely the corporate will move towards sustainable development.**

#### **2.4 Gender structure of directors of board of directors, environmental sustainability and corporate sustainable development**

Environmental sustainability is the key to the sustainable development of corporates. It refers to the process of corporates providing production and services to minimize damage to the environment. Further, environmental sustainability means meeting the needs of the present without compromising the well-being of future generations. Adams and Ferreira (2009) pointed out that environmental sustainability refers to the establishment of a formal and specific sustainable management target system by a corporate, which is promoted to stakeholders such as shareholders, creditors, suppliers, employees, the government, and the community, and then drives the overall implementation of the corporate. Energy saving and carbon reduction, based on the concept of socially responsible investment. Although environmental sustainability is recognized by all parties, practice is a challenge. What is certain is that with the increasingly serious environmental problems, the destruction of the ozone layer and global warming, more

and more people are actively paying attention to global problems. Its old product design thinking not only emphasizes quality and cost, but also advocates sustainable development and harmony with the natural ecological environment.

Looking back at the relevant literature on organizational population and environmental sustainability, it is found that the more heterogeneous the gender of board directors, the more practical the policy of environmental sustainability implementation strategies will be (Van and Ingley, 2003; Farrell and Hersch, 2005); The heterogeneity of the gender composition of directors is not only related to the degree of environmental sustainability, but also reflects the value of the corporate itself and expands the level of overall social impact (Hillman, Cannella and Harris, 2002; Farrell and Hersch, 2005). Research by Taticchi (2013) shows that female directors play an active role in promoting the communication and coordination with the external environment or on-the-spot execution within the board of directors, supporting companies to promote green-friendly products, advocating energy saving and carbon reduction practices, integrating with daily operations, and regularly tracking results.

Environmental sustainability has become one of the most important issues for citizens of the planet. From the perspective of resource dependence theory, the survival of a corporate needs to absorb resources from the surrounding environment and needs to be interdependent and interact with the surrounding environment to achieve the goal of pursuing sustainable development. As mentioned in the previous paragraph, many studies on organizational demography support that the more heterogeneous the gender composition of board directors, the more complete the environmental regulations and implementation details formulated within the corporate, and the more obvious the degree to respond to environmental sustainability and move towards a low-carbon corporate. Based on the descriptions in this subsection, this study believes that the more heterogeneous the gender composition of board directors, the higher the degree of corporate environmental sustainability, and the more conducive it is to corporate sustainable development. Based on this, hypothesis 4 was proposed in this study:

**Hypothesis 4: The more heterogeneous the gender composition of the board of directors, the higher the degree of implementation of environmental sustainability, and the more likely the corporate will move towards sustainable development.**

### **3. Research Method**

#### **3.1 Research Framework**

In the past literature regarding corporate sustainable development, claims were focused on: The fulfillment of social responsibility by a corporate was mandatory condition for the corporate to move towards sustainable development (Arowoshegbe and Emmanuel, 2016). The conclusion of this study was consistent with such viewpoint, however, who was the push hand for the implementation of corporate social responsibility? As mentioned in the previous section, board of directors was the key. However, most related literature focused on the discussion of the function of board of directors (Dyllick and Hockerts, 2002; Galeitzke et al, 2016), and few of them focused on the investigation of the influence of gender structure of directors of board of directors on corporate social responsibility and corporate sustainable development. Based on this, the focuses of this study were: To clarify the relationship among gender structure of directors of board of directors, corporate social responsibility and corporate sustainable development, and the results were as in figure 1. In the figure, corporate social responsibility

was made up of corporate governance, corporate commitment, social participation and environmental sustainability.



figure 1 Research Framework

### 3.2 Research Object

The research objects of this study were mainly from large scale Taiwanese corporates from 2007-2017 “Commonwealth entrepreneurial citizen TOP 30” with annual revenue over 10 billion NT dollars. The selection of “Commonwealth entrepreneurial citizen award” can be divided into “large scale corporate” with annual revenue over 10 billion NT dollars, “middle scale corporate” with annual revenue below 10 billion NT dollars, and “small giant corporate” with annual revenue below 5 billion NT dollars and “foreign corporate”. The selection was conducted by experts from different industries with credibility and social reputation, meanwhile, selection was based on four perspectives such as corporate governance, corporate commitment, Social participation and environmental sustainability. The scoring detail of each perspective was as follows: for corporate governance, the main evaluations were on the independence and transparency of information disclosure of board of directors; for corporate commitment, the main evaluations were on commitment to consumers, and incubation and care provided to the employees; for Social participation, the main evaluations were on if the corporate has made long term involvement in specific social topics and exploited its influence; for environmental sustainability, the main evaluation were on the survey if the corporate has specific goals and actions in the environmental protection and energy management.

“Commonwealth corporate citizen award” focused on the evaluation of four perspectives of corporate social responsibility, for example, corporate governance, corporate commitment, social participation and environmental sustainability. The corporate sustainable development as mentioned in this study was based on triple bottom lines of “society”, “economy” and “environment”. Among them, “society” was a mean score associating two parts of corporate

commitment and social participation in “Commonwealth corporate citizen award”; “economy” was evaluated by EPS (earning per share) of each corporate in each year; “environment” was evaluated by assessed score of environmental sustainability from “Commonwealth corporate citizen award”.

The main research object of this study was large scale corporate with the following reasons: (1) The corporate social responsibility of large-scale corporate was usually the focus of the general public. Although many famous domestic corporates were quite successful in promoting corporate social responsibility, yet some corporates still did not reach the standard. To large scale corporate, “maximizing the profit” was not the only goal, and how to adjust the business operation guidelines based on sustainable society, sustainable economics, and sustainable environment and how to feedback to the society were usually the most important business operation task of a corporate. (2) Large scale corporate tended to make overall consideration on the stakeholder’s benefit and to fulfill corporate governance. (3) The decision regarding sustainable development in large scale corporate usually needed the support from board of directors for its fulfillment. The fulfillment of the above three points depends on the board of directors. Among them, the gender structure of board of directors might be an important key of the business operation strategy and direction of the corporate.

### **3.3 Data Source**

The research data were mainly from two databases: “Commonwealth magazine corporate citizen survey” and “Taiwan Economic Journal”. Commonwealth magazine corporate citizen survey center claimed that: The corporate should not be just a profit-making tool, it should also be a responsible citizen. The future leading corporate should not just be a leader in the commercial world, it should also be a leading force of the society. And it was concluded that the key questions faced by present CEO, in addition to profit, should be the answering of the following questions: Can the existence of this company benefit the community? Does the corporate improve the environment? Does the corporate violate the moral things in the process of creating fortune? The corporate social responsibility perspective of this study covered the evaluation of four variables of “corporate governance”, “corporate commitment”, “Social participation” and “environmental sustainability”, and it was survey result from database of 2007-2017 “Commonwealth magazine corporate citizen survey”.

Taiwan Economic Journal (TEJ) was founded on April 1990. TEJ database mainly included three major parts of corporate’s business operation status, market performance and the viewpoint from the market participators. Meanwhile, the raw data of gender structure of directors of board of directors, corporate visibility, organization scale, business revenue and gross domestic production of this study came from the survey of 2007-2017 “Taiwan Economic Journal” database.

### **3.4 Empirical Model**

The main focus of this study was to investigate the relationship between corporate social responsibility and corporate sustainable development from the gender structure of directors of board of directors. Basically, endogenous issue exists between corporate social responsibility and corporate sustainable development. There were usually two methods in solving endogenous issue: One was to use 2-stage least-square (2SLS) of instrument variables (IV); another was to use randomized controlled trial (RCT). The research data of this study was secondhand data; therefore, it cannot be conducted through RCT experimental design, consequently, 2SLS was

adopted to solve endogenous issue.

When 2SLS was used to solve endogenous issue in this study, “corporate visibility” and “percentage of female directors in board of directors” were adopted as tools to forecast corporate social responsibility. The reason was as follows: The implementation of corporate social responsibility was one of the shortcuts in enhancing corporate visibility. Moreover, the samples of this study were large scale corporates of annual revenue over 10 billion NT dollars, all these large corporates will prepare and submit corporate social responsibility report to be provided to stakeholder to understand the nonfinancial performance information of the corporate and to attract the attention of corporate’s responsible investors and to enhance its international visibility. Next, when the percentage of female directors of board of directors of a corporate was higher, the thinking points for decision making of the corporate will be more diversified (Adams and Ferreira, 2009). In this study, it was thought that female directors, in the fulfillment of corporate social responsibility, might put more care and engagement.

Bazen (2011) pointed out that the first stage of 2SLS can only be predicted using general linear regression, otherwise, the estimation on second stage will have deviation. Therefore, the verification steps of 2SLS were as follows: First, in the first stage, IV that was related to endogenous variable but not related to dependent variable was selected, then regression estimation was conducted on endogenous variable. That is, in the first stage of this study, two tool variables of “corporate visibility” and “percentage of female directors in board of directors” and the control variables will be used to conduct general least square forecast on corporate governance, corporate commitment, Social participation and environmental sustainability of corporate social responsibility. The forecast model of first stage was as follows:

$$CSR_{kit} = \beta_0 + \beta_1 VISIBILITY_{it} + \beta_2 PWOMEN_{it} + \beta_3 WOMEN_{it} + \beta_4 INDUSTRY_{it} + \beta_5 LNSIZE_{it} + \beta_6 LNSALE_{it} + \beta_7 GDP_{it} + \varepsilon_{it} \dots\dots\dots (1)$$

Next, in the second stage, the regression forecasting values of corporate governance, corporate commitment, social participation and environmental sustainability obtained in the first stage were placed into the target model of the second stage regression to facilitate the carry-out of empirical study. The target model of 2SLS was as follows:

$$SUSTAINABILITY_{it} = \beta_0 + \beta_1 WOMEN_{it} + \beta_2 INDUSTRY_{it} + \beta_3 LNSALE_{it} + \beta_4 LNSIZE_{it} + \beta_5 GDP_{it} + \beta_6 GOVERNMENT_{it} + \beta_7 COMMITMENT_{it} + \beta_8 PARTICIPATION_{it} + \beta_9 ENVIRONMENT_{it} + \varepsilon_{it} \dots\dots\dots (2)$$

In formula (1) and (2), the definition and operation of each variable was as follows:

- $i, t, k$  :  $i$  meant the corporate,  $t$  meant the year,  $k = 1,2,3,4$ .
- $SUSTAINABILITY$  : Corporate sustainable development. In the evaluation, the definition of triple bottom lines of Arslan. and Kisacik (2017) was followed; in operation, it was sustainable economics +sustainable society+ sustainable environment- (sustainable economics×sustainable society)-(sustainable society×sustainable environment)-(sustainable economics×sustainable environment)+(sustainable economics×sustainable society×sustainable environment). For

- sustainable economics, it was operated based on EPS of each corporate each year, for sustainable society, the average of weighting scores of corporate commitments and social participation of Commonwealth corporate citizen survey was adopted.
- CSR* : The scope included corporate governance, corporate commitment, social participation and environmental sustainability.
- VISIBILITY* : Corporate visibility. For corporates belong to “Commonwealth corporate citizen TOP30”, judge if it belonged to the compositional stock of 0050 of Taiwan’s capital market, if so, its coding value should be 1; otherwise, its coding value should be 0.
- PWOMEN* : Percentage of female members of board of directors.
- WOMEN* : For the heterogeneous level of gender of directors of board of directors, BLAU index will be adopted for operation. The evaluation of *BLAU* index was  $1 - \sum_{i=1}^n P_i^2$ ,  $P_i$  was the percentage of male or female in the gender structure of board of directors,  $0 \leq \text{BLAU index} \leq 0.5$ .
- INDUSTRY* : It was industry type. It can be divided into traditional industry, technological industry, and financial service industry. The coding values were respectively 1, 2, 3, etc.
- GOVERNMENT* : It was corporate governance. It was weighting operation given based on Commonwealth CSR corporate index, and the weighting value was 1-10.
- COMMITMENT* : It was corporate commitment. It was weighting operation given based on Commonwealth CSR corporate index, and the weighting value was 1-10.
- PARTICIPATION* : It was social participation. It was weighting operation given based on Commonwealth CSR corporate index, and the weighting value was 1-10.
- ENVIRONMENT* : It was environmental sustainability. It was weighting operation given based on Commonwealth CSR corporate index, and the weighting value was 1-10.
- LNSALE* : It was business revenue. To avoid high divergence, natural logarithm will be adopted.
- LNSIZE* : It was organization scale. In operation, it was the same as business revenue, and natural logarithm will be adopted.
- GDP* : It was gross domestic production. In operation, deflator trillion dollars will be adopted.

## 4. Analysis and Discussion

### 4.1 Research Sample Analysis

#### • Female director ratio

In this study, the research object adopted will be Taiwan's large-scale corporates from Commonwealth corporate citizen TOP 30 with revenue over 10 billion NT dollars. Moreover, the collection period of sample data was from 2007 to 2017, which was about 11 years, a total of about 330 large scale corporates formed the research sample; meanwhile, the data structure was longitudinal pooled data. Meanwhile, the industry type of the research sample can be divided into traditional industry, technological industry, and financial service industry.

Table 1 showed, for a sample period of 2007-2017 for traditional industry, technological industry and financial service industry, the percentage of female directors was respectively 7.63%, 7.96% and 5.45%, in other words, the percentage was too low. Figure 2 was the variation situation of percentage of female directors for research sample in the period of 2007-2017 for traditional industry, technological industry, and financial service industry. Although there was change in different industry for different year, yet the percentage of female directors was still too low, for a long term and average trend, the percentage trend change of female directors for different industry was not large. Figure 3 was the variation trend of gross domestic production in the period of 2007-2017. Table 2 was correlation coefficient matrix among different research variables; table 3 was the descriptive statistical quantity of each research variable.

Table 1: Statistical table of head count of female directors of corporates in 2007-2017  
"Commonwealth magazine corporate citizen Top 30"

Industry type	Traditional industry (N=106)		Technological industry (N=170)		Financial service industry (N=54)		Subtotal (%)
Year	Female director head count	Female director percentage (%)	Female director head count	Female director percentage (%)	Female director head count	Female director percentage (%)	
2017	2	2.30	10	7.87	6	8.96	6.38
2016	9	8.91	11	8.03	1	3.85	6.93
2015	2	2.35	7	5.60	5	8.62	5.52
2014	2	2.38	13	10.40	4	7.14	6.64
2013	3	3.95	8	6.56	1	2.00	4.17
2012	7	5.98	8	6.67	2	2.74	5.13
2011	8	7.62	6	6.25	7	12.50	8.79
2010	9	7.50	5	4.55	3	9.09	7.05
2009	7	4.05	5	5.56	3	13.64	7.79
2008	9	7.96	13	13.40	1	2.56	7.98
2007	6	3.85	5	6.25	2	6.90	5.67
average	5.8	7.63	8.3	7.96	3.18	7.09	6.55

Note: N=330.

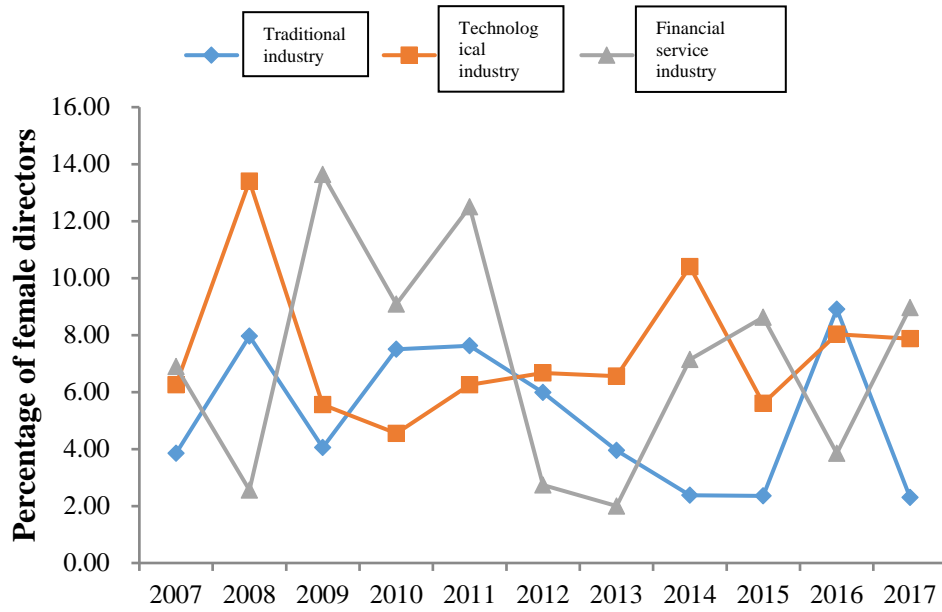


Figure 2: Change of percentage of female directors of corporates in 2007-2017 “Commonwealth magazine corporate citizen Top 30”

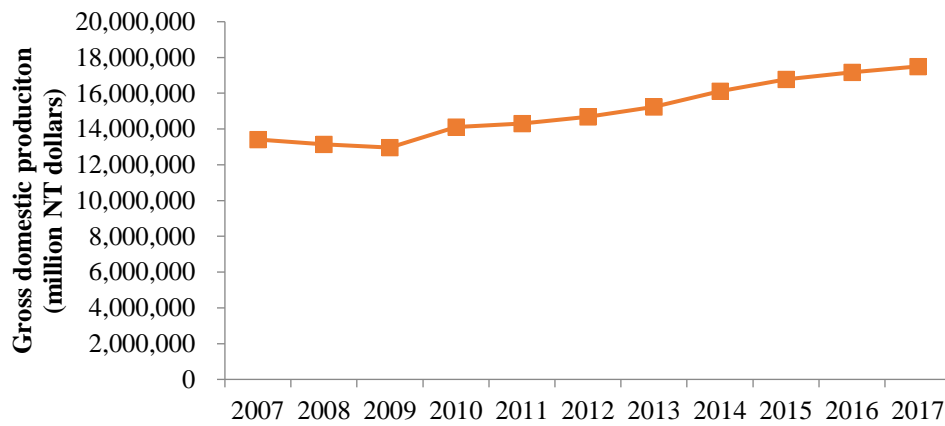


Figure 3: Trend chart of 2007-2017 gross domestic production

Table 2: Table of correlation coefficients of different variables

	2	3	4	5	6	7	8	9	10
1. Corporate revenue	0.551***	0.120**	0.170***	0.133**	0.159***	0.241***	.168***	-.050***	-0.081***
2. Organization scale		0.021	0.290***	0.183***	0.278***	0.226***	-.238***	.077***	0.073***
3. Gross domestic production			0.604***	0.464***	0.324***	0.403***	.097***	0.021	0.035**
4. Corporate governance				0.686***	0.597***	0.463***	.190***	0.120***	0.134***
5. Social commitment					0.645***	0.582***	.266***	0.108***	0.127**
6. Corporate engagement						0.584***	.251***	0.037**	0.056***
7. Environmental sustainability							.219***	.049***	0.072***
8. Sustainable development								.068***	0.087***
9. Percentage of female directors									0.978***
10. Gender heterogeneity of directors of board of directors									

Note: N=330; \*p<0.10; \*\*p<0.05; \*\*\*p<0.01

Table 3: Descriptive statistical quantity of different variables

	Mean	Standard deviation	Maximal value	Minimal value
1. Corporate revenue (natural logarithm)	11.70	1.10	15.25	8.99
2. Organization scale (natural logarithm)	10.30	1.15	12.48	7.39
3. Gross domestic production (deflator trillion dollars)	16.52	0.10	16.68	16.38
4. Corporate governance	7.89	1.27	9.75	3.90
5. Social commitment	7.93	0.90	9.90	5.00
6. Corporate engagement	8.18	0.83	9.70	3.90
7. Environmental sustainability	8.18	0.99	9.70	4.60
8. Sustainable development	4.54	1.39	7.52	0.94
9. Percentage of female directors	0.07	0.11	0.63	0.00
10. Gender heterogeneity of directors of board of directors	0.11	0.15	0.48	0.00

Note: N=330

#### 4.2 2SLS: first-stage regression model

##### • Endogenous test

Endogenous issue might exist between corporate social responsibility and corporate sustainable development. For example, a corporate that did its duty of social responsibility well was a key for it to move towards sustainable development; on the contrary, if a corporate wanted to head towards the direction of sustainable development, the fulfillment of corporate social responsibility was its mandatory condition. Under such condition, Durbin-Wu-Hausman test (Wooldridge, 2010) was adopted in this study to test respectively if the explanatory variables such as corporate governance, corporate commitment, social participation and environmental

sustainability can reach significance level on the residual terms of sustainable development of the corporate. The test result was as shown in table 4. The table showed that the residual terms of four explanatory variables such as corporate governance in corporate social responsibility can reach positive significance level. It can be confirmative that endogenous relationship between corporate social responsibility and corporate sustainable development did exist.

Table 4: Durbin-Wu-Hausman endogenous test result

	corporate governance	corporate commitment	Social participation	environmental sustainability
Residual term ( <i>t</i> value)	2.98	4.00	4.70	3.38
P value	0.003***	0.000***	0.000***	0.001***

Note: N=330; \*p<0.10; \*\*p<0.05; \*\*\*p<0.01

• **First-stage regression model: The Effect of Instrument variables and control variables on CSR**

Based on the endogenous cause-and-effect relationship existed between two variables of corporate social responsibility and corporate sustainable development in the previous section, in this study, corporate social responsibility variables such as corporate governance, corporate commitment, Social participation and environmental sustainability will initially be used as dependent variables; meanwhile, the gender heterogeneity of directors of board of directors will be used as explanatory variable, and corporate visibility and percentage of female director will be used as tool variables; moreover, industry type, corporate revenue, organization scale and gross domestic production will be used as control variables, and they were united for conducting regression, the test result was as shown in table 5.

Table 5: Two-stage least square method: First stage regression model

	corporate governance	corporate commitment	Social participation	environmental sustainability
Constant term	-14.06 ***	-8.17 ***	-5.02 ***	-8.02 ***
Corporate visibility				
Taiwan 50 composite index stock	4.44 ***	2.03 ***	2.60 ***	0.58
Non-Taiwan 50 composite index stock	Reference group	Reference group	Reference group	Reference group
Percentage of female directors	0.41	-0.60	-0.70	-0.64
Gender heterogeneity of directors	-0.25	0.83	0.60	0.81
Industry type				
Traditional industry	-3.75 ***	-1.08	-1.20	5.76 ***
Technological industry	0.73	2.06 ***	0.72	6.96 ***
Financial service industry	Reference group	Reference group	Reference group	Reference group
Corporate revenue	-3.94 ***	-1.81	-1.93	-0.20
Organization scale	4.54 ***	2.49 ***	3.62 ***	5.33 ***
Gross domestic production	15.01 ***	9.21 ***	6.07 ***	8.54 ***
Explanatory variation (Adj. R <sup>2</sup> )	0.61	0.30	0.20	0.32
F statistical quantity	71.79 ***	18.13 ***	11.10 ***	19.96 ***

Note: N=330; \*p<0.10; \*\*p<0.05; \*\*\*p<0.01

In the table, the explanatory variation of each variable on corporate governance regression was 61%, and it was 30% on corporate commitment regression, it was 20% on Social participation regression, it was 32% on environmental sustainability regression. In the tool variable aspect, the regression results of corporate visibility on corporate social responsibility variables such as corporate governance, corporate commitment, social participation and environmental sustainability can all satisfy corporates belonging to Taiwan 50 composite index, and the level of fulfilling corporate social responsibility was generally superior to corporates belonging to non-Taiwan 50 composite index stocks, in other words, the expectation of this study was met.

However, the regression result of percentage of female directors in board of directors on each variable of corporate social responsibility, in corporate governance aspect, positive insignificant relationship existed ( $\beta=0.41$ ,  $p>0.01$ ), in corporate commitment aspect, negative insignificant relationship existed ( $\beta=-0.6$ ,  $p>0.1$ ), in Social participation aspect, negative insignificant relationship existed ( $\beta=-0.7$ ,  $p>0.1$ ), in environmental sustainability aspect, negative insignificant relationship existed ( $\beta=-0.64$ ,  $p>0.1$ ). Such result showed that there was no fixed relationship between percentage of female directors in board of directors and corporate social responsibility.

### 4.3 2SLS: Second-Stage Regression Model

#### • Board Directors' Gender Structure, Corporate Governance and Sustainability

The test result of least square method regression model of the second stage of this study was as shown in table 6. In the table, model 1 showed that: On the basis of variables such as control industry type, corporate revenue, organization scale and gross domestic production, the influence of gender heterogeneity of directors of board of directors on corporate sustainable development showed positive and insignificant relationship ( $\beta=0.24$ ,  $p>0.1$ ); and corporate governance to corporate sustainable development showed positive significant relationship ( $\beta=6.24$ ,  $p<0.01$ ). Such finding showed that the gender heterogeneity of directors of board of directors did not play the antecedent variable of the influence of corporate governance on corporate sustainable development. In other words, the gender heterogeneity of directors in board of directors was not related to corporate governance, however, corporate governance showed significant positive correlation with corporate sustainable development. In this regard, Hypothesis 1 of this study is not supported.

TABLE 6: Two-stage least square method: Second stage regression model

	Corporate sustainable development			
	Model 1	Model 2	Model 3	Model 4
Constant term	5.77 ***	5.89 ***	5.11 ***	4.92 ***
Gender heterogeneity in board of directors	0.24	-1.70	2.44 ***	-2.04 ***
Corporate social responsibility				
Corporate governance	6.24 ***			
Corporate commitment		6.28 ***		
Social participation			6.30 ***	
Environmental sustainability				5.03 ***
Industry type				
Traditional industry	4.27 ***	2.66 ***	2.40 ***	-4.93 ***
Technological industry	2.21 ***	-1.92	1.26	-4.47 ***
Financial service industry	Reference group	Reference group	Reference group	Reference group
Corporate revenue	8.34 ***	8.37 ***	8.05 ***	6.43 ***
Organization scale	-9.17 ***	-9.14 ***	-9.05 ***	-6.10 ***
Gross domestic production	-5.70 ***	-5.86 ***	-5.22 ***	-4.89 ***
Explanatory variation (Adj. R <sup>2</sup> )	0.37	0.37	0.37	0.34
F value	24.38 ***	24.47 ***	24.54 ***	21.60 ***

Note: N=330; \* $p<0.10$ ; \*\* $p<0.05$ ; \*\*\* $p<0.01$

Why gender heterogeneity of directors of board of directors did not show significant relationship with corporate governance? Domestic corporate governance related laws and regulations are well specified, related tracking and assessment mechanism is quite good, and the level of fulfillment of corporate governance will not be different due to gender structure of directors of board of directors. For example, Company Act has clear standard on the operation of directors and supervisors; Securities and Exchange Act has required listed companies to obey clear standards in terms of information disclosure, the setup of board of directors and its members and setup of functional committee, the related rights of shareholders and internal control system, etc. Moreover, Stock Exchange, under the instruction of Financial Supervisory Commission, starting from 2014, has gradually announced year by year “corporate governance assessment ranking”, therefore, all the listed or OTC (over the counter) companies all work very hard to keep the reputation and image of their own corporates.

However, positive significant relationship existed between corporate governance and corporate sustainable development was mainly due to that one of the greatest keys of corporate governance was to use related balancing mechanism to help the corporate to achieve the goal of value maximization. In this study, it was thought that if a corporate was to reach the goal of corporate value maximization and good corporate governance, management on investors, consumers, employees, suppliers, community and neighborhood and government organization should be well emphasized, and this was an important key for a corporate to move towards sustainable development.

#### • Board Directors' Gender Structure, Corporate Commitment and Sustainability

In this section, analysis and discussion will be conducted through the influence of gender structure of directors of board of directors and corporate commitment on corporate sustainable development. In table 6, model 2 showed that: On the basis of variables such as control industry type, corporate revenue, organization scale and gross domestic production, the influence of gender heterogeneity of directors of board of directors on corporate sustainable development showed negative insignificant relationship ( $\beta = -1.70$ ,  $p > 0.1$ ); however, positive significant relationship existed between corporate commitment and corporate sustainable development ( $\beta = 6.28$ ,  $p < 0.01$ ). Such finding showed that gender heterogeneity of directors of board of directors did not play antecedent variable for the influence of corporate commitment on corporate sustainable development. Therefore, hypothesis 2 of this study is also not supported.

“Corporate commitment” was commitment from corporate to its employees, upper and lower stream suppliers, and customers. For example, in one aspect, corporate must to created happy workplace so that employees will get well taken care and have chance to grow, in another aspect, the corporate must provide product or service of good quality to its customer; in another aspect, the corporate has to take care of its employees, upper and lower stream suppliers and customers well, and has to respond to their needs. These need-to-do and must-do commitments were basically the basic skill of a corporate, and they will not be different no matter who is director or president of the corporate. Therefore, the gender heterogeneity of directors of board of directors will not be the antecedent variable for the influence of corporate commitment on corporate sustainable development. However, corporate commitment was one important ring of corporate social responsibility, and it was also one of the actions for a corporate to move towards sustainable society. Further speaking, not only international giant company started to

require Taiwan's corporate to do something in corporate commitment, and many Taiwanese corporates started to ask its suppliers to obey corporate commitment. In this study, the corporate social responsibility reports of many sample corporates in recent years had been browsed, and specific actions for corporate commitment had been summarized and arranged, they basically included human resource incubation, the creation of happy workplace, corporate listening policy and information security management mechanism, etc. The real fulfillment of these corporate commitments not only has corporate social responsibility implemented, but also has become an important ring to lead the corporate to move towards sustainable development.

#### • Board Directors' Gender Structure, Social Participation and Sustainability

The test results of gender heterogeneity of directors of board of directors, social participation and corporate sustainable development were shown in model 3 of table 6. On the basis of variables of control industry type, corporate revenue, organization scale and gross domestic production, the influence of gender heterogeneity of directors of board of directors on corporate sustainable development showed positive and significant relationship ( $\beta=2.44$ ,  $p<0.1$ ); and social participation to corporate sustainable development showed positive and significant relationship ( $\beta=6.30$ ,  $p<0.01$ ). This result fully supported hypothesis 3 of this study. That is, the higher the gender structure heterogeneity of board of directors, the higher the social participation of the corporate, consequently, the sustainable development of the corporate will be higher.

The gender structure heterogeneity of directors of board of directors was highly related to the discussion process and decision-making direction. In this study, it was thought that the joining of females in the board of directors has become an indispensable force in the board of directors. As compared to male directors, Female directors showed great differences in cognition, thinking, values and processing way of emotion. For example, When females were making decision, they had moral and ethical features that were significantly distinguished from males, and they tended to be stronger in altruism, and they also tended to have stronger monitoring function and responsibility on others' moral behavior (Hillman, Cannella, and Paetzold, 2000); female directors tended to have stronger social responsibility orientation and monitoring motives in the corporate (Hillman, Cannella and Harris, 2002); therefore, when more females joined the board of directors, the board of directors will tend to see a problem in more diversified way, consequently, each director can have discussion based on his/her own viewpoint, therefore, a solution with wide-layer and diversified consideration can be formed (Van and Ingley, 2003). Therefore, the higher the gender structure heterogeneity of the directors of board of directors, the higher the social participation of the corporate, consequently, this will be beneficial for it to move towards sustainable development.

#### • Board Directors' Gender Structure, Environmental Sustainability and Sustainability

Model 4 of Table 6 showed that: On the basis of variables such as control industry type, corporate revenue, organization scale and gross domestic production, the influence of the gender heterogeneity of board of directors on corporate sustainable development showed negative and significant relationship ( $\beta=-2.04$ ,  $p<0.1$ ); however, positive and significant relationship existed between environmental sustainability and corporate sustainable development ( $\beta=5.03$ ,  $p<0.01$ ). This showed that: When the gender heterogeneity of board of directors was lower, the corporate tended to have higher requirement on environmental sustainability, consequently, the corporate will have higher possibility to move towards

sustainable development. For such result, although it showed that gender heterogeneity of board of directors played the role of antecedent variable of the influence of environmental sustainability on corporate sustainable development, yet the negative and significant relationship between gender heterogeneity of directors of board of directors and environmental sustainability showed a contrary result with positive claim of hypothesis 4 of this study. Therefore, Hypothesis 4 is not supported.

For the result that when gender heterogeneity of board of directors was lower, the corporate tended to have higher requirement on environmental sustainability, it might be because corporates in the research samples were mostly large scale corporates in Taiwan, the effectiveness of their fulfillment in corporate social responsibility was of higher rank, yet their average percentage of female directors in board of directors was lower than 8%, in other words, gender heterogeneity in the board of directors was quite low. In addition to that, surveys on corporate social responsibility reports in recent years of many sample corporates were conducted in this study, and their specific actions in environmental sustainability were briefly as follows: (1) Taiwan has strict regulation on corporate environmental sustainability, therefore, under the limits of related regulations, obedience of laws and regulations was naturally business operation standard of most large-scale corporates. (2) Bear in mind the spirit of taking care both environmental protection, industrial development and persist to the goal of “Zero accident in environment, safety and health to ensure sustainable business operation”. (3) Clean was always the industry development trend: Obey laws, regulations, and commitment, cooperate with government’s energy saving and carbon reduction policy, strengthen the pollution prevention action and fulfill continuous improvement. (4) Act in accordance with network development trend, make green cloud equipment and deepen the green culture, etc.

## **5. Conclusions and Management Implications**

### **5.1 Conclusions**

“Profit gaining” was usually the most basic social responsibility of a corporate. Once a corporate has profit, it will have spare energy to fulfill social responsibility other than profit gaining, and the corporate will have further chance to move towards sustainable development. Then, what was the key for a corporate to gain profit? Lots of literature surrounding around the discussions of the influence of gender structure of directors of board of directors on the profit gaining of a corporate (Andres et al., 2005; Rose, 2007; Campbell and Minguez, 2008). Harjoto et al. (2015) pointed out gender structure of directors of board of directors was highly related to the fulfillment of corporate social responsibility. As mentioned above, board of directors had a great mission of clarifying the development direction and strategy of a corporate, therefore, whether a corporate can fulfill social responsibility, or whether a corporate can gain the profit and head towards the direction of sustainable development, the gender structure of directors of board of directors might be an important antecedent factor!

To clarify the above problem, starting from the viewpoint of gender structure of directors of board of directors, viewpoints based on agency theory, resource dependence theory and human capital theory had been applied in this study to describe the advantages of gender heterogeneity of directors. Empirically, the research data were taken from two databases of 2007-2017 “Commonwealth magazine corporate citizen Top 30 survey” and “Taiwan Economic Journal” to set up a longitudinal pooled data research sample. Due to the existence of endogenous phenomenon between corporate social responsibility and corporate sustainable

development, two-stage least square estimation was used in this study for test. The empirical result showed that: (1) The influence of gender structure of directors of board of directors on “corporate governance” and “corporate commitment” did not reach significance level. (2) For two corporate social responsibilities such as “Social participation” and “environmental sustainability”, the gender structure of directors of board of directors all played the antecedent variable of corporate social responsibility on sustainable development, however, the direction was different. (3) Corporate social responsibility was the mandatory condition for sustainable development of a corporate. (4) For different industry, the effectiveness of fulfillment of different corporate social responsibility was different.

Based on the empirical results mentioned above, questions were proposed in this study: (1) Presently, directors of large-scale corporates in Taiwan had fulfilled “corporate governance” and “corporate commitment”, but what did all the stakeholders feel about it? (2) For the gender structure of directors of board of directors in large scale corporates in Taiwan, the percentage of male directors was almost 92%! As compared to advanced countries such as Europe and America, there was still a large gap! Although the Stock Exchange office had expectations on listed or OTC companies, yet it was not forced regulation. Based on the subjective and objective environment in Taiwan, can Taiwan catch up with advanced countries in this aspect? (3) It was found in this study that when the gender heterogeneity was higher (males) in directors of board of directors, the persistence on the concept of “environmental sustainability” was stronger, consequently, the corporate will have higher possibility to move towards sustainable development. This result was not consistent with lots of literature cited in this study! How come? Further tracking and discussion needed to be done.

## **5.2 Management Implications**

As stated in the conclusions, six management meanings were proposed in this study:

- **The fulfillment of social responsibility by a corporate was the same as moving towards sustainable development by a corporate**

A corporate must satisfy corporate social responsibility of triple bottom lines of economy, society and environment before it can move towards the direction of triple co-prosperity of sustainable development (Dyllick and Hockerts, 2002; Kramer et al., 2013). In this study, four perspectives of “corporate governance”, “corporate commitment”, “Social participation” and “environmental sustainability” were adopted to assess the social responsibility of a corporate. These four perspectives were respective response to different stakeholder’s need. “Corporate governance” targeted on shareholder; “environmental sustainability” targeted on environment; “Social participation” targeted on community and group and “corporate commitment” targeted on employees, upper and lower stream suppliers, cooperation partners and customers. No matter the perspective was “corporate governance”, “corporate commitment”, “Social participation” and “environmental sustainability”, it was found in this study that they all showed positive and significant relationship with corporate sustainable development. This transferred the message that a perfect corporate social responsibility must take care of benefits of all stakeholders such as shareholders, employees, customers, suppliers, consumers, communities, nation and natural environment, etc.

- **The gender heterogeneity of directors of board of directors of large scale corporates in Taiwan was too low**

The perfection of operation of board of directors was highly related to the business operation result of a corporate. It was pointed out in lots of researches that gender structure of board of directors was a key factor for the perfection of operation of board of directors; as compared to gender homogeneity of directors of board of directors, the gender heterogeneity of board of directors were more probable to bring wider information, knowledge and viewpoint to the corporate (Ely and David, 2001; Adams and Ferreira, 2009; Hafsi and Turgut, 2013). In addition to that, gender heterogeneity of directors of board of directors could bring all kinds of opinions and inspirations to the board of directors, and it could more likely strengthen two functions of “resource supply” and “monitoring and controlling” of the board of directors (Hillman and Dalziel, 2003; Ronald et al., 2011). What worth mentioning was, in many corporates of Europe, female directors occupied a percentage of about 40%, although Taiwan has promoted gender mainstreaming, and in the corporate governance assessment of Stock Exchange, “whether any gender of directors of a corporate could reach above 1/3 head counts in the board of directors” was also listed as an index. However, since it was not a forced standard, it was just “all sizzle but no steak”. In this study, it was thought that the principle of “any gender of directors of a corporate should reach above 1/3 head counts in the board of directors” should be put into law by the Ministry of Finance, because this was the only way to fulfill and implement gender equality policy, to guarantee the right of females, and to meet the international development trend.

- **Perfect corporate governance should take care of both inside and outside**

From the viewpoint of agency theory, why CEO could abuse the rights and have wrongdoing such as theft, misappropriate use of corporate property for market operation, or making fraud to investors and the public? It could be explained from the concept of fraud triangle of stress, opportunity, and rationalization (Schnatterly, Gangloff, and Tauschke, 2018). In the stress aspect, CEO explained that it was “**have to**” behavior, for example, the internal stress source such as expectation from board of directors, and external stress source such as competition, business operation performance and investor’s expectation, etc. In the opportunity aspect, CEO **might** think that even if inappropriate action was made, it might sometimes be acceptable; the reason to cause this might come from internal entrepreneurial right, organizational complexity, corporate culture and the structure of board of directors; it might also come from external industrial culture, industrial complexity and the macroeconomic status, etc. In the rationalization aspect, CEO will lose gradually the moral standard, and will tend to think that “**It’s OK**” to have inappropriate behavior occasionally; the reasons for the creation of such atmosphere might be due to internal factors such as personal difference of CEO, corporate culture and control mechanism, or it might be affected by external factors such as industrial culture and globalization, etc. Therefore, for perfect corporate governance, board of directors needed to take care of both inside and outside of the corporate.

- **Corporate commitment should be warm**

Corporate commitment was core action to implement corporate social responsibility. Corporate commitment was not commitment just purely for shareholders and employees, it was also commitment to all the related stakeholders. Commitment for fulfilling welfare to employees was already basic skill for business operation, and every corporate can do it. However, some corporates, in order to let other people think their company were filled with happiness, they listed lots of welfare, but they are nothing but encouragement instead of welfare,

and employees cannot feel happy at all when staying in those corporates, and this was not so-called corporate commitment. What is interesting is that along with the change of business operation environment, the way and mindset for a corporate to treat its employees should also be reformed, for example, for employee's satisfaction survey, in the past, it was carried out in single way of top-down, but today, employee's awareness was high, therefore, the corporate must create bottom-up atmosphere to keep best talents within the corporate and to create the best business operation performance. Therefore, for corporate commitment, the key to success was to let people feel true "warmness".

- **Social participation should not only possess width, but also depth.**

"Social participation" of a corporate usually means the involvement in charity activity and the feedback to local need, in other words, it was basic cognition to corporate social responsibility from the public. Pure one-time money or material donation was only "basic requirement", To do deeper social participation such as "feedback to remote village and incubation for people", "environmental protection and public welfare", "community building" and "charity and health promotional activity", a corporate must have longer term strategy to respond to the community demand, to enhance the entire society development and to create social value. Presently, the focus of social participation was: The corporate must recognize that it was different than the non-profit organization because non-profit organization had higher social features, but for a corporate, it played a role of social work division, that is, its focus was on economic performance. Therefore, when a corporate was involved in social participation, it should exploit its strength and enhance corporate's competitive advantages, therefore, corporate can have long term and stable operation to move towards sustainable development.

- **Environmental sustainability should take care of not only "point", but also "face"**

Corporates in Taiwan had done lots of jobs in "point" in environmental sustainability topics. For example, the change into energy saving lamps and trash classification, etc.; however, there was few deployments in "face". How can environmental sustainability take care of "face" aspect? For example, the "circular economy" of turning the recycling resource into new material was fulfillment of "face". Specifically speaking, circular economy was a regeneration system, through the slow-down and reduction of material and energy cycle, the input, disposal, and emission of resource can be reduced. In the process of circular economy, it will be zero emission, zero waste, and the generated by-product, or the damaged product or product no longer to be used will not be seen as "waste", instead, they can be raw material and substance for new production cycle. In addition, not just production industry can have action in environmental sustainability; retail industry can also propose green actions to the environments in terms of plastic reduction, waste reduction and energy saving; for financial industry, it can also have green financial action through the issuance of green bond, and it can also exploit its power of "investor", for example, not to invest or not to give financing to corporate or project that will destroy the environment. Therefore, a corporate should include the environmental protection issue into the overall strategic thinking of the corporate, and it should not see the natural environment as external influence again. A corporate should see the protection of environment as its own mission, and eventually, turn it into its own future competitive advantage.

### **5.3 Research limitations**

Due to the fact that the proportion of female directors on corporate boards of directors in

Taiwan has been low for many years, and the average proportion of female directors on corporate boards of directors in this research sample from 2007 to 2017 was only about 6.55%, the empirical results of such research samples may not truly reflect that the gender structure of board directors is a antecedent variable between corporate social responsibility and corporate sustainable development, which is one of the main limitations of this study. In addition, due to the difficulty of data collection, this study did not control for the organizational demographic variables such as the educational background and age of board directors, which may also affect the accuracy of the empirical results of this study, which is another research limitation of this study. The above two limitations are the main directions of future study.

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