Attributes and Methods for Evaluating Sustainable CSR

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Abstract. The present study was conducted with the aim to understand corporate social responsibility and study the various factors that affect the policy of CSR. Air pollution, water pollution, renewable energy use rate, involvement in community service, power consumption rate, maintenance of community environment, etc are some of the factors that have been used by researchers for conducting CSR studies. With the help of this study, some other factors were identified that were not considered in previous studies. This project thus aims to identify various factors that affect sustainable CSR.

Keywords: Corporate Social Responsibility, MADM, Green CSR, Sustainability

1. Introduction

Over the years with the introduction of CSR, extensive studies have been conducted in this field. The world has slowly become more digital, global and health conscious over the years. Over time, corporations have got more and more power and there has been an abuse of the said power. So, the stakeholders increasingly look for evidence of goodness and goodwill by the corporations towards the society. Since its introduction in the 1950s, various studies have been conducted on the topic of CSR. Initial studies have divided corporate social responsibility into 4 parts: Philanthropic, Ethical, Legal, Economic responsibility. Later studies conducted have introduced more and more criteria to upon which Corporate Social Responsibility depends. [1] expanded on previous research and introduced six level criteria for corporate social responsibility: employee right protection, sustainable development, Environment protection, Corporate Integrity, Social Welfare-charitable activities, consumer-creditor rights protection. Firms today encourage a better corporate governance and promotion of ethical practices while policy making decisions. Unlike in the previous decades when the modernisation of the global industry began, corporations now a days face a larger and ever-growing number of international and national laws regarding the environmental aspects, human rights, labour standards and social aspects of the work environment. For example, the Korean electronic industry agrees that it is not an easy task to be socially responsible [2]. However, they contribute by making sustainable products and building a sustainable economy through their innovations, thus making their products commercially desirable and environment friendly [3]. With the ever-increasing visibility of a firm on online sources, as well as issues like climate change, growing unemployment, inequality, sustainability crisis, and other large number of social, economic and political issues, a firm’s stand on various issues and CSR initiative it employs have become important in maintaining a firm’s image among the people of the society, as well as the various stakeholders and stockholders associated with the firm. The actions that a firm takes to promote social good, above its own interests and the law required goes into making a positive image for the firm.

2. Literature review
For the review for the study, various research papers written by different authors were studied. The literature review was divided into two aspects, corporate social responsibility, and Green Production.

2.1. Corporate Social Responsibility
CSR and its related MEMS have become a commonplace among the corporate firms in the past few years. They typically encompass the stakeholder relationships of a corporation, its sustainability programs, its’s socio-ecological commitments and social responsibilities. CSR refers to a company or a corporation exhibiting ethical behaviour towards the society, including stakeholders and stockholders. A corporation is responsible for the effects it has on the stockholders, stakeholders as well as the society surrounding them including the effects its presence has on the environment around it. CSR is a firms voluntarily taking up activities towards different stakeholders[4] which is beyond the boundaries of the interest of the firm[5]. The implementation of Green CSR reflects a firm’s initiatives for the good of the environment rather than it simply obeying the implemented laws and regulations. While increasing environmental performance by reducing waste and emissions has become strategically essential for a firm’s business production and operation, CSR has drawn a considerable amount of attention in academics nowadays. CSR states that a corporation is responsible for its ethical behaviour towards the society and that it is responsible for the effects it has by its presence on the society and the environment around it. Kao and Lin[6] asserted that employees, suppliers, competitors, customers, community members and the environmental interests should be taken into consideration. With the stakeholders taking decisions in a firm and ethically responsible way, a balance between the environment and economic responsibilities points out to preserving the profitability of the corporation. CSR has been defined as a part of a firm’s behaviour that is above its economic interests which aim to influence its stakeholders positively [7]. Any attempts to strengthen a corporation’s business with the means of sustainable awareness should be made with the aim for the concern for the environment and the desire to make a difference in the community. This initiative can be taken by avoiding social harm, respecting the moral rights of an indivual and the community as whole and doing what is correct [8]. This awareness includes initiatives like financial contributions which can be transmitted into such kinds of cultural and social enterprises [9]. The study of CSR the years has not been limited to a singular field. CSR has been extensively studied across various industries including tourism [10], music[11], electronics, gaming industry[12]. The various dimensions of CSR have been adopted for hotels like hotel specific performance, general financial performance, use of resources, etc.[13]. Similar models were applied to the Cruise industry[14] and lodging [15]. These studies showed a higher mention of the dimensions of society, environment and economy. An assessment of CSR in tourism industry showed that the most important criteria affecting the CSR of a tourism firm were Sustainable resource management, sustainable tourism and customer education and protection. Gaming industry is one those industries that have gained a rapid increase in their reputation in the last 15 years. Research has shown that a firm’s CSR activities can improve a customer’s s attitude towards the firm, improving its image and in turn improving and solidifying customer loyalty and patronage[16]–[18]. A Study has shown activities undertaken directly influence a customer’s satisfaction levels and also influence their behaviours[19]. A company that provides these services and hence that lie in a grey area, should not consider the CSR initiatives as a burden. Instead they should consider these initiatives as an investment as it is activities like these which help the people to see the firm in a different light and help build a favourable reputation[20]. Studies have shown that a firm that takes its social responsibilities seriously tends to leave a good impression on its customer and leads to an increase in financial performance (Sen & Bhattacharyya, 2004; Mohr and Webb, 2005).CSR is not only simply about the compliance of some legal obligations, but also of voluntary integration of procedures and strategies for social, labour related and concern for environment and taking responsibility for the actions that have occurred due to the steps taken by the organization. One of the important objectives of CSR is to maximise its contribution toward sustainable development [2], paying attention to not only people but working condition, quality of process and product. Adoption of various CSR policies allow greater opportunity and flexibility to a firm to address social problems with various innovative services and products, that allows it to further competitiveness.
2.2. Green Production

Green Production refers to continuous applications of various integrated environmental strategies to production processes, the products produced, and services that are being provided to increase overall efficiency of a plant, reduce the emissions being released, thus controlling pollution and overall, decreasing the effect a corporation has on the environment around us. According to Porter and Kramer (2006), the policy of Corporate Social Responsibility is one of the greatest competitive strategies being employed in the 21st century. Within the last decade, there has been a rapid increase in the number of production facilities being established all over the world. However, with this increase in the production facilities the raw materials consumption, use of already dwindling energy resources, emissions of waste water and air, and release of more waste materials into the surroundings have increased. Green production which initially aimed at reducing environmental wastes and reducing pollution has gradually expanded its scope to integrating greener manufacturing processes during production, making use of renewable energy sources, introducing zero waste facilities. Green growth helps to in increasing efficiency of economy by introducing green growth technologies, reducing pollution, lowering production costs, and attracting foreign investments, thus overall improving a country’s competitiveness [21].

Green CSR is the waste reduction policy of a firm to maximize their inputs and reduce the negatively influencing outputs that harm the environment [22]. Hence, with firms becoming more environmentally responsible, this has changed the value of stockholders from profit-oriented to eco-friendly Thus, green CSR is the origin of proactive innovation [23]. Green CSR shows a corporation’s effort to accommodate pressure from stakeholders, thus indirectly affecting the firm’s performance. Firms that undertake Green CSR tend to obtain a lot of support from stakeholders, including political support and financial support to promote their innovation activities. The figure below (fig. 1) shows the integration of various dimensions of CSR for a successful accomplishment of Green Corporate Social Responsibility.

![Figure 1: Main Pillars of Green CSR](image)

3. Research Methodology

This study began with an extensive study and review of various literatures to understand the topic of Corporate Social Responsibility (CSR) and identifying the attributes that affected the concept of CSR and affected the policies of CSR across various industries. Various research papers were studied and thoroughly reviewed and analyses to determine various dimensions and attributes that affected CSR policies. The analysis focused on CSR practices and sustainability among enterprises. The Research methodology used has been shown below using fig. 2.
4. Methods
Older studies have conducted research and evaluated CSR along with its various dimensions and attributes. The process of evaluation for various studies conducted has however not been limited to a singular method.

4.1. DEMATEL Method
The study conducted by Gou et al [20] evaluated the relationship between GP and CSR based on 4 dimensions and 12 criteria. The four dimensions and 12 criteria were resolved using the process of DEMATEL. This method is characterized by its use of various matrices to calculate strengths and causalities among the various factors. This type of model is suitable for research involving questionnaire with experts. It involves:

(i) Establishing the direct-relation matrix $X$
An n-by-n matrix is generated based upon pairwise comparisons generated in an expert survey. In this matrix $X$, $X_{ij}$ represents the degree to which the criterion $i$ affects criterion $j$.

\[
X = \begin{bmatrix}
0 & x_{12} & \cdots & x_{1n} \\
x_{21} & 0 & \cdots & x_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
x_{n1} & x_{n2} & \cdots & 0
\end{bmatrix}
\]

(ii) Normalising the direct-relation matrix $N$
Based upon the direct-relation matrix $X$, a normalised direct-relation matrix $N$ is generated using the following equation (1)

\[
X = \lambda X \quad \cdots (1)
\]

Where, $\lambda = \frac{1}{\max_{i,j} x_{ij}} \sum_{j=1}^{n} x_{ij}$

(iii) Total-relation matrix $T$
After generation of the known $N$, identity matrix, I is be used to acquire the direct-indirect matrix $T$, which is also referred to as the total-relation matrix calculated by Eq.2:

\[
T = \lim_{k \to \infty} (N + N^2 + \cdots + N^k) = N(I + N)^{-1} \cdots (2)
\]

(iv) Calculation of degree of influence
It is calculated using Eq.3 & Eq. 4.

\[
D_i = \sum_{j=1}^{n} t_{ij} \quad (i = 1, 2, ..., n) \cdots (3)
\]
4.2. TOPSIS method
Lee [23] conducted a study for CSR and environmental criteria for supplier selection. The criteria for CSR was divided into three dimensions: general criteria, CSR related criteria and environmental related criteria with 21 different attributes. Hence MCDM method was used to determination of core affecting factors. MCDM or multi-criteria decision-making method has various methods like TOPSIS rank method which was used here for the study. TOPSIS is a rank method that that considers positive ideals and negative ideal solutions and ranks the alternatives based upon actual situation of candidate alternatives.

(i) Assume that there are n criteria and m alternates
Assume the decision matrix (D) = (x_ij), where x_ij represents the rating of the m alternatives by n criteria.

\[
D = \begin{bmatrix}
x_{11} & \cdots & x_{1n} \\
\vdots & \ddots & \vdots \\
x_{m1} & \cdots & x_{mn}
\end{bmatrix}
\]

(ii) Normalize the decision matrix
Normalize the decision matrix to obtain the normalized decision matrix (R) by following Eq.5:

\[
r_{mn} = \frac{x_{mn}}{\sum_{i=1}^{n} x_{mi}} , \ m=1,2,\ldots,M \& n=1,2,\ldots,N 
\]

(iii) Determine PIS and NIS
Find the weighting given by

\[
W = (w_1,w_2,\ldots,w_n) \text{ along with the weighted normalized decision matrix (V) as:}
\]

\[
V = \begin{bmatrix}
w_1r_{11} & \cdots & w_1r_{1n} \\
\vdots & \ddots & \vdots \\
w_mr_{m1} & \cdots & w_mr_{mn}
\end{bmatrix}
\]

\[
A^+_n = \{v^+_1, v^+_2, \ldots, v^+_m\} \text{ gives the Positive ideal solution for n criteria by taking the maximum value for the desirable criteria or the minimum value for the non-desirable criteria.}
\]

\[
A^-_n = \{v^-_1, v^-_2, \ldots, v^-_m\} \text{ gives the Negative ideal solution for the n criteria by taking minimum criteria for desirable criteria, or by taking maximum value for non-desirable criteria.}
\]

(iv) Calculate distance of each alternative from PIS and NIS
Calculate distance of each alternative from PIS and NIS

\[
d^+_m = \sqrt{\sum_{n=1}^{N} (v^+_m - v^+_n)^2} \quad (6)
\]

, where m=1, 2, M

\[
d^-_m = \sqrt{\sum_{n=1}^{N} (v^-_m - v^-_n)^2} \quad (7)
\]

, where m=1, 2, \ldots, M

(v) Estimate the closeness coefficient of each alternative
The closeness coefficient C_m is given by Eq. 8:

\[
C_m = \frac{d^-_m}{d^-_m + d^+_m} , m=1, 2, \ldots, M \quad (8)
\]

(vi) Rank the alternative and select the alternative
Rank the alternatives you have and select the appropriate alternative with highest value of calculated C_m

4.3. AHP method
Saaty introduced AHP method in the year 1970. There have been lots and lots of advancements in AHP method [24][25][26][27][28]. Stankova [29] used the AHP method, also known as analytical hierarchy method to determine the various factors that influenced the policy of CSR. This study consisted of three dimensions for the CSR assessment of chosen companies and consisted of the
dimensions: economic field, environmental field and social field and consisted of attributes including safety, recycling, eco innovations, employee welfare, employee volunteering, etc. The AHP method is another type of MCDM methods.

(i) **Make hierarchical structure**
Each of the criteria is chosen according to the definition of CSR while it is specified by the sub-criteria.

(ii) **Preparation of Saaty’s matrices**
An appropriate number of Saaty’s matrices are prepared. Each matrix has as many rows, columns as the number of criteria and sub-criteria involved the in the decision-making process. The decisions are written in the matrix according to the preference of the components.

(iii) **Computation of normalized weights**
Once all paired comparisons on different hierarchy levels are made, normalized local weights \( w_i \) is calculated. There are different methods for calculation of local weights. The Eq. 9:

\[
w_i = \frac{v_i}{\sum v_i} \quad \ldots \quad (9)
\]

(iv) **To Assess the consistency**
To assess the consistency of the factors, \( \lambda_{max} \) is computed calculated using Eq. 10:

\[
\lambda_{max} = \frac{1}{N} \sum_{i}^{N} \frac{\sum_{j=1}^{N} w_{ij}}{w_i} \quad \ldots \quad (10)
\]

(v) **Consistency Evaluation**
Consistency index CI is calculated according to the formula Eq.11:

\[
CI = \frac{\lambda_{max} - N}{N - 1} \quad \ldots \quad (11)
\]

After the calculation of the consistency index, the consistency ratio is calculated.

(vi) **Global Importance Calculation**
The Global importance calculation is calculated using Eq.12:

\[
W_{ij} = w_i \cdot w_{ij} \ldots \ldots (12)
\]

5. **Conclusion**
The study was conducted with the aim to determine various factors of a firm or a corporation. Based on the research conducted, factors were divided into three dimensions consisting of 23 criteria. The three dimensions that have been obtained are sustainability, social elements and environment performance. The first dimension to be included is sustainability. Sustainability in simplest terms involves the firm making decisive use of resources and decreases the impact they have on their surrounding environment. This dimension includes criteria like green transport, product recyclability, raw material selection etc. The second dimension which was considered is social elements. Social element is defined as the society that surrounds us. It includes the people around and the work that a firm does for the betterment of the people and the society it is surrounded by. Society is an important part while studying CSR. The more a firm works for the society, better is the image of the firm in the society, making it more likeable and giving it a competitive edge over other firms. The social element dimension consists of various criteria including community safety & health and maintenance of community environment. The final dimension to be considered is environmental performance. Environmental Performance considers the various pollutants being discharged by a corporation into the environment as well as the resources being consumed by the firm for its operation. This dimension includes criteria like air pollution, water pollution and power consumption by the firm. This is article is an initial review of the extensive study which has been conducted. The study will be continued further and compiled into the next article. The further study will involve creating good, well defined clusters for the various criteria that have been obtained in this study. Once a defined cluster has been obtained, the criteria and dimensions will be ranked accordingly by means of MADM methods to find out which of the criteria most affect the CSR policy of firm.

REFERENCES
[1] H. Chen And X. Wang, “Corporate Social Responsibility and Corporate Financial Performance in China: An Empirical Research from Chinese Firms,” Corp. Gov. Int. J. Bus. Soc., Vol. 11, No. 4, Pp. 361–370, Aug. 2011.

[2] D. Di Zhang And L. A. Swanson, “Social Entrepreneurship in non-profit Organizations: An Empirical Investigation of The Synergy Between Social and Business Objectives,” J. non-profit Public Sect. Mark., Vol. 25, No. 1, Pp. 105–125, 2013.

[3] J. (Sunny) Kim, H. Song, C.-K. Lee, And J. Y. Lee, “The Impact of Four CSR Dimensions on A Gaming Company’s Image And Customers’ Revisit Intentions,” Int. J. Hosp. Manag., Vol. 61, Pp. 73–81, Feb. 2017.

[4] M. Malik, “Value-Enhancing Capabilities of CSR: A Brief Review Of Contemporary Literature,” J. Bus. Ethics, Vol. 127, No. 2, Pp. 419–438, Mar. 2015.

[5] A. Mcwilliams And D. Siegel, “Corporate Social Responsibility: A Theory of The Firm Perspective,” Acad. Manage. Rev., Vol. 26, No. 1, Pp. 117–127, 2001.

[6] “Strategy and Society: The Link Between Competitive Advantage And Corporate Social Responsibility,” Strateg. Dir., Vol. 23, No. 5, Apr. 2007.

[7] D. Turker, “Measuring Corporate Social Responsibility: A Scale Development Study,” J. Bus. Ethics, Vol. 85, No. 4, Pp. 411–427, Apr. 2009.

[8] M. A. Camilleri, Corporate Sustainability, Social Responsibility and Environmental Management: An Introduction to Theory and Practice With Case Studies. Cham: Springer International Publishing, 2017.

[9] K. Bondy And K. Starkey, “The Dilemmas of Internationalization: Corporate Social Responsibility In The Multinational Corporation,” Br. J. Manag., Vol. 25, No. 1, Pp. 4–22, 2014.

[10] J. S. Horng, H. Hsu, And C. Y. Tsai, “An Assessment Model of Corporate Social Responsibility Practice In The Tourism Industry,” J. Sustain. Tour., Vol. 26, No. 7, Pp. 1085–1104, 2018.

[11] T. Green, G. Sinclair, And J. Tinson, “Do They Know It’s CSR At All? An Exploration of Socially Responsible Music Consumption,” J. Bus. Ethics, Vol. 138, No. 2, Pp. 231–246, 2016.

[12] J. (Sunny) Kim, H. J. Song, C. K. Lee, And J. Y. Lee, “The Impact of Four CSR Dimensions on A Gaming Company’s Image And Customers’ Revisit Intentions,” Int. J. Hosp. Manag., Vol. 61, Pp. 73–81, 2017.

[13] L. K. Cvelbar And L. Dwyer, “An Importance-Performance Analysis of Sustainability Factors for Long-Term Strategy Planning In Slovenian Hotels,” J. Sustain. Tour., Vol. 21, No. 3, Pp. 487–504, 2013.

[14] X. Font, M. Guix, And M. J. Bonilla-Priego, “Corporate Social Responsibility in Cruising: Using Materiality Analysis to Create Shared Value,” Tour. Manag., Vol. 53, Pp. 175–186, 2016.
[15] S. E. Levy and S. Y. Park, “An Analysis of CSR Activities in The Lodging Industry,” *J. Hosp. Tour. Manag.*, Vol. 18, No. 1, Pp. 147–154, 2011.

[16] S. Sen, C. B. Bhattacharya, And D. Korschun, “The Role of Corporate Social Responsibility in Strengthening Multiple Stakeholder Relationships: A Field Experiment,” *J. Acad. Mark. Sci.*, Vol. 34, No. 2, Pp. 158–166, 2006.

[17] M. D. M. G. De Los Salmones, A. H. Crespo, And I. R. Del Bosque, “Influence of Corporate Social Responsibility on Loyalty and Valuation of Services,” *J. Bus. Ethics*, Vol. 61, No. 4, Pp. 369–385, 2005.

[18] X. Nan and K. Heo, “Consumer Responses to Corporate Social Responsibility (CSR) Initiatives: Examining the Role of Brand-Cause Fit in Cause-Related Marketing,” *J. Advert.*, Vol. 36, No. 2, Pp. 63–74, 2007.

[19] P. Martinez And I. Rodriguez Del Bosque, “CSR and Customer Loyalty: The Roles of Trust, Customer Identification with The Company and Satisfaction,” *Int. J. Hosp. Manag.*, Vol. 35, Pp. 89–99, 2013.

[20] M. Lindorff, E. Prior Jonson, And L. Mcguire, “Strategic Corporate Social Responsibility in Controversial Industry Sectors: The Social Value of Harm Minimisation,” *J. Bus. Ethics*, Vol. 110, No. 4, Pp. 457–467, Nov. 2012.

[21] N. A. A. Saufi, S. Daud, And H. Hassan, “Green Growth and Corporate Sustainability Performance,” *Procedia Econ. Finance*, Vol. 35, No. October 2015, Pp. 374–378, 2016.

[22] C. Post, N. Rahman, And E. Rubow, *Green Governance: Boards of Directors’ Composition And Environmental Corporate Social Responsibility*, Vol. 50, No. 1. 2011.

[23] W. Wu, Y. Liu, T. Chin, And W. Zhu, “Will Green CSR Enhance Innovation? A Perspective of Public Visibility And Firm Transparency,” *Int. J. Environ. Res. Public. Health*, Vol. 15, No. 2, Pp. 1–14, 2018.

[24] Srivastava, Priyank, Dinesh Khanduja, And Vishnu P. Agrawal, “Integrating Agile Thinking into Maintenance Strategy Performance Analysis.” *International Journal Of Process Management And Benchmarking*, Vol. 8, No. 2, pp. 228-245, 2018.

[25] Srivastava, P., Khanduja, D., & Agrawal, V. P., "A framework of fuzzy integrated MADM and GMA for maintenance strategy selection based on agile enabler attributes", *Mathematics-in-Industry Case Studies*, Vol. 8, No. 1, pp.5, 2017.

[26] Panchal, D., Jamwal, U., Srivastava, P., Kamboj, K. and Sharma, R., "Fuzzy methodology application for failure analysis of transmission system", *International Journal of Mathematics in Operational Research*, Vol. 12, No. 2, pp.220-237, 2018.

[27] Panchal, D. and Srivastava, P., "Qualitative analysis of CNG dispensing system using fuzzy FMEA–GRA integrated approach", *International Journal of System Assurance Engineering and Management*, Vol. 10, No. 1, pp.44-56, 2019.
[28] Srivastava, P., Khanduja, D. and Ganesan, S., Fuzzy methodology application for risk analysis of mechanical system in process industry. International Journal of System Assurance Engineering and Management, pp.1-16, doi.org/10.1007/s13198-019-00857-y

[29] Š. Staňková, “Assessment of Corporate Social Responsibility by Using AHP Method Together with Group Decision Making,” p. 11, 2014.