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Sustainable Investment: Interrelated among Corporate Governance, Economic Performance and Market Risks Using Investor Preference Approach

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Abstract: Prior studies are lacking on the drivers of sustainable investment. Hence, this study examines the relationship between the social aspects, environmental aspects, economic benefits, market conditions, and corporate governance issues on sustainable investment. Sustainable investment has been rising since the last decade. However, sustainable investment is preceded by ethical investment, green investment, and socially responsible investment. In order to understand the sustainability of an investment before decision-making, it proposed a set of attributes to measure its sustainability using investor's linguistics preferences. The proposed attributes are interrelated and based on investor's linguistic preferences. The study employs the fuzzy set theory to handle the uncertainty resulting from the vagueness of linguistic terms and applies decision making trial and evaluation laboratory (DEMATEL) to determine the nature of interrelationships among sustainable investment attributes. The result indicates that corporate governance, economic performance, and market risks are the causal aspects of sustainable investment. In addition, this study found that transparency, anti-corruption, and board diversity were the two most important criteria of corporate governance. Furthermore, the three most important criteria of economic performance presented the model were excess return, market value, and shareholder loyalty. The theoretical and practical implications of sustainable investment are discussed.

Keywords: sustainable investment; environment; social and corporate governance; socially responsible investment; investor preferences; fuzzy set theory; decision-making trial and evaluation laboratory (DEMATEL)

1. Introduction

Along with the changing of a global era, investments are transforming in many forms to be financially, socially, and environmentally sustainable. Sustainable investment as an investment procedure potentially affects sustainable development through the coordination of monetary concerns, as well as long haul environmental, social, and governance (ESG) criteria while making investment decisions [1,2]. Sustainable investment is an ethical and green investment that uses ESG investment, or socially responsible investment (SRI) [3]. The recent increase in the volume of SRI has stirred the

enthusiasm of scholastic professionals and policymakers in assessing the connection between corporate social benefits, environmental impacts, and financial performance (triple-bottom-line (TBL)) [4]. For instance, [5] applied panel data and statistical methods to analyze the integration of ESG policies for green production into the investment strategy on pensions for sustainable investment. Integrate sustainable investment to ESG preferences of investors using fuzzy techniques for trader preferences by similarity to the ideal situation. They presented the perspective of establishing the association between social, economic, and environmental benefits of the sustainable supply chain finance [6]. Nevertheless, they mentioned corporate governance or market risks [7].

Thus, the previous studies failed to address the interrelationships among the social aspects, environmental aspects, economic benefits, market conditions, and corporate governance issues on sustainable investment [8,9]. Therefore, to deliver sustainable growth and the long-term goals in building a sustainable investment there is a need to develop a set of measures that integrate the ESG with the economic benefits and market risks to access sustainable investment. The determination of portfolio investment is a decision of best choice which ought to be made considering a set of measures. Socially capable utilization practices and the aim to invest resources in a socially mindful way affirms that investors have socially dependable utilization, and obtaining these propensities is the most alluring aspect to financial institutions that attract socially capable venture investment. A model to which the intention to invest in an SRI is explained by the investor's perception, the perception of the personal gain, and the effectiveness of the action on decision-making [10]. However, investor perception of SRI is always on qualitative information. Therefore, the qualitative information of the SRI needs to be properly addressed.

The aforementioned qualitative information is defined as the subjective assessment of the investors focusing on the advantages and disadvantages for the ESG on sustainable investment. The absence of prerequisites and clearness regarding the viability of ESG integration with the market risk being never far away. This pattern of ESG incorporation with SRI may prompt confusion and misrepresentative marketing of practices. SRI, as discussed, could be green and profitable; indeed, this is subject to being taken advantage of and the emergence of ESG performance. They referred to the firms' ESG performance and indicated its exposure to non-sustainability risk attributes [11], such as corporate governance, economic performance, and market risks might incorporate product and commercial-practical risks [12,13]. They investigated whether investors support good ESG practices, by selectively providing the equity to assure their growth, or potentially deprive poor ESG practices. Investors that follow socially responsible and green investments should have guidelines for screening market conditions for practitioners [14]. The practitioner that provides the evidence for screening considerably impacts on the economic performance of a sustainable investment [15–17].

The ESG criteria are quite subjective and assessing factors accurately might be challenging. Investor judgment is based on subjective preferences and relates to investors' preferences. The qualitative information and analyses that integrated a set of measures among the ESG are important for the SRI as a sustainable investment. The fuzzy set theory deals with qualitative information and transforms the linguistic preference into the comparable crisp value [6,18]. Moreover, this study proposes to apply decision-making trial and evaluation laboratory (DEMATEL) to handle the interrelationships among the attributes [19–21]. The attributes are always with the interrelationships. This study aims to present a set of measures that integrate social impact, environmental management, economic performance, market conditions, and corporate governance on sustainable investments using an investor's preferences approach.

The contribution of the current study is as follows: (1) propose a set of integrated ESG criteria and sustainable investment measures; (2) use investor's preferences to approach the ESG qualitative information; (3) present the causal interrelationships among the aspects and indicate the improvement criteria in practices. The data for this study were collected by questionnaire. The questionnaires were delivered to 15 VIP investors on stock market industry in Indonesia. The rest of the study is organized as follows. The Section 2 analyses the previous literature and the proposed measures. The Section 3

describes the industrial background and method in this study. The results are provided in the Section 4. Further implications, conclusions, and future study opportunities appear in the Section 5.

2. Literature Review

This section includes sustainable investment literature and the proposed measures in this study.

2.1. Sustainable Investment

Sustainable investment has attracted the interest of academics and practitioners to analyze investor preferences on SRI that have value for ESG in the global market, which is full of volatility and uncertainty [22,23]. For sustainable investment, the dominant driver of market growth is institutional investors, whereas retail investors encompass a small part of total sustainable investment. The investor's decision to select a stock's portfolio is important for the future growth of sustainable investment. For instance, how attitudes, and moral and subjective norms influence investor's intention. The study indicated both attitude, and moral and subjective norms positively affect intention, and how intention positively affects investor's behavior regarding SRI [24]. In addition, Erragragui et al. [25] reported that in highly integrated SRI markets, despite being more subject to systemic risk, they offered better performance on the portfolio over time. Previous studies presented subjective judgment and investor preferences on the investment.

In general, the value of sustainable investments impacts on society, green environment, and high firms' economic performance. This discussed that prohibited sectors are not aligned with specific norms for SRI that are recognized and accepted [5]. The investor needs to have a screening method to select investment targets using a firms ESG performance [5,22,26]. This found that in terms of risk-adjusted returns, ethical pension plans, which invest in companies with SRI, achieve the same financial gains with traditional pension plans [5]. The authors suggested that the reasons might be that companies in stock markets have made green investments, which allows for improvements in their SRI, resulting in more cost-effective and technically feasible production methods, and consequently a performance level with similar financial gains [27,28].

In addition, they found that the market condition such as oil price, gold price, and energy and financial sectors are net receivers of risk spillovers, while the stock indexes are net contributors of risk spillovers [29]. Prior studies were analyzed for risks and returns between sustainable investments and conventional investments [2,16,30]. The corporate ESG indicates a positive relationship between corporate social and economic performance [3]. The firms' profitability associated with ESG performance. Specifically, the firms with the best environment tended to have lower profits for investors [4]. Still, prior studies are do not address interrelationships and are do not include the market conditions in the assessment; these studies indicate that there are interrelationships among the social impact, environmental management, economic performance, and corporate governance. However, these studies also failed to analyze the effect of the interrelationships.

Prior studies do not address the interrelationships among the attributes, and there are studies that ignore linguistic preferences or qualitative information [3–5]. For instance, the panel data and statistical methods to analyze the integration of ESG policies for green production into the investment strategy on pensions for sustainable investment. A fuzzy technique for order preference by similarity to ideal situation (known as TOPSIS) method to handle the integration of ESG attributes into the evaluation process among socially responsible investors [3]. Linear regressions with a data panel to analyze data from listed firms and present superior ESG performances when controlling for the firm size [4]. The corporate sustainability strategy, using a descriptive statistic method, on how the strategy influences the business models in the effort to increase economic profitability [31].

2.2. Proposed Measures

Sustainable investment is an investment procedure that has a potentially positive effect on sustainable growth through the combination of social impact, environmental management, economic

performance, market condition, and corporate governance attributes into investment decisions. A brief description of aspects and criteria of the proposed measures can be found from Table 1 and detailed descriptions are given below.

Table 1. Aspects and criteria of sustainable investments.

Aspects		Criteria	Description	References
A1. Social Impact	C1	Employment quality	The quality of employment living standard is earned from the firm	[2,3,5,32]
	C2	Human rights	The workers are the eligible worker by law	
	C3	Community	The role of the firm is to the community	
	C4	Product responsibility	Provide the products and services with green concepts	
	C5	Charitable contribution	The percentage of philanthropic contributions	
A2. Environmental Management	C6	Resource reduction	Small resources to produces a product	[3,12]
	C7	Emissions reduction	Emissions produced by a firm	
	C8	Product and process Innovation	The performance of a firm to create innovation	
	C9	Energy efficiency	The efficiency of energy that is used in a firm	
A3. Economic Performance	C10	Firm Performance	The performance of the firm per month	[3,4,33]
	C11	Shareholder loyalty	The loyalty of shareholder to the investors, e.g. share the dividend to the investor	
	C12	Market Value	The market value of the firm's stock	
	C13	Excess Return	The return earned by a stock (or portfolio of stocks) and the risk-free rate. which is usually estimated using the most recent short-term government treasury bill	
A4. Market Risks	C14	Oil price	The firm who depend on the global oil price	[22,29,32]
	C15	Exchange Rate	The exchange rate of USD to local currency	
	C16	Interest Rate of US	The firm impacts on FED rate	
	C17	Inflation	The rate of inflation in a country	
A5. Corporate Governance Performance	C18	Transparency and anti-corruption	The firm with transparency and anti-corruption	[3,26]
	C19	Executive Pay/Compensation policy	The ratio to pay the executive and compensation policy	
	C20	Board diversity	The diversity of the trustee board in the firm	
	C21	Sustainability reporting	The firm makes a sustainability report	

2.2.1. Social Impact

Undertaking social impact initiatives is a win-win situation and appeals to socially conscious consumers and employees. The social impact is presented as the quality of employment living standards earned from the firm (C1) by setting up social changes with business goals, practices, and profits. Investors even walk out on their most loved firms if they believe they are not taking a stand for environmental and societal issues. The role of the firm is to benefit the stakeholder community (C3) and provide products and services with green SRI (C4). In addition, workers are eligible workers under the laws and regulations, and have a positive impact on the stakeholder community (C2). It is especially important to involve your stakeholders to allow them to see first-hand the work you are doing for your community. Firms practice social impacts by donating resources such as money, services, or products to social causes. Bigger firms, in general, have more resources that can help charities and local community stakeholders. Firms still have to increase the percentage of philanthropic contributions (C5).

2.2.2. Environmental Management

Environmental Management is a systematic approach to finding a pragmatic approach for saving energy, water, and materials, as well as reducing negative environmental impacts to minimize any irreversible ecological damage along with aiding in resources and emissions [12]. Resource reduction identifies attributes that rise between meeting needs and protecting resources (C6). Emission reduction is the effort of the production process (C7). The reduction is applied to the product and process innovation (C8). For instance, the firm always considers the efficiency of energy used in the firm (C9). Consequently, proactive environmental management is a win-win proposition because this helps: property cost reduction; achieve recognition for environmental leadership; preserve and protect unique destinations [34].

2.2.3. Economic Performance and Market Risks

Market risks are when there is the possibility of an investor experiencing losses due to risks that affect overall financial market performance [13,35]. Market risk and specific risk are identified as oil price (C14), exchange rate (C15), the interest rate of the United States (C16), and inflation (C17), and are also the net receivers of risk spillovers. However, these market risks are dependant on corporate governance performance. The interest rate risk of the United States covers the inflation volatility that may accompany interest rate fluctuations due to fundamental attributes, such as central bank announcements related to changes in the interest rate of the United States.

2.2.4. Corporate Governance

These identify the distribution of rights and responsibilities among stakeholders such as the board of directors, managers, shareholders, creditors, auditors, regulators, and other stakeholders, and include the rules and procedures for making decisions in firms' affairs. All of these stakeholders are subject to include processes through transparency and anti-corruption (C18), executive pay/compensation policy (C19), board diversity (C20), and sustainability reporting (C21), and the objectives are set and pursued in the context of the social, regulatory, and market environment.

3. Proposed Method

This section includes the industrial background and the proposed analytical fuzzy DEMATEL method.

3.1. Industrial Background

Sustainable investment has a screening that is strict in the environment, social, and governance criteria. In this case, the firm is included in the SRI index through the screening process. The pursuit of achieving sustainability is to drive the capital from investors to the impact of investment. SRI is the sustainable investment in the stock market which leads the investor to create more value and positive impact on the environment and society. This SRI presents the firm's management on the ESG. Usually, the ESG attributes include a qualitative information approach. The investor preferences are built upon the assessment of firms ESG management. This study collected investor preferences from 15 VIP investors in the stock market industry in Indonesia. The investors have 10 years' experience of the investment. This study is conducted with face-to-face interviews to enhance expert validity. Hence, the measures are satisfied with the content, and expert validity from the literature review and experts view on the sustainable investment.

3.2. Fuzzy DEMATEL

The fuzzy DEMATEL is an effective fuzzy aggregation method to transfer human judgments into fuzzy linguistic variables. The qualitative information is always imprecise and subjective to the nature of human judgments. The linguistics preferences are converted into triangular fuzzy numbers.

The defuzzification converts fuzzy numbers into crisp values [36] and develops the conversion of fuzzy data into crisp values, which uses the fuzzy minimum and maximum to determine the left and right values. The total weighted values are computed from a weighted average employing fuzzy membership functions $\tilde{z}_{ij}^f = \left(\tilde{z}_{1ij}^f, \tilde{z}_{2ij}^f, \tilde{z}_{3ij}^f \right)$. The triangular fuzzy numbers are converted into crisp values and applied into the DEMATEL total direct relation matrix the crisp value are utilized as shown in Table 2.

Table 2. Fuzzy linguistic preferences.

Linguistic Preferences	$\tilde{z}_{1ij}^f$	$\tilde{z}_{2ij}^f$	$\tilde{z}_{3ij}^f$
No influence	0	0.1	0.3
Very low influence	0.1	0.3	0.5
Low influence	0.3	0.5	0.7
High influence	0.5	0.7	0.9
Very high influence	0.7	0.9	1.0

DEMATEL enables analysis and solves problems using a visualization method. The DEMATEL depicts the interrelationships and the influential effects between cause and effect groups to dram the causal and effect diagram. The attributes are divided into cause and effect groups. A visual relationship among the attributes provides a better understanding of the structural relationship among aspect and criteria groups [37–39]. The DEMATEL method is applied to construct a causal network structure among the sustainable investment attributes based on investor preferences. The interrelationships between cause and effect attributes are converted. A set of attributes $S = \{s1, s2, s3, \cdots, sn\}$ and particular pairwise interrelationships are for modelling in a mathematical relation. The procedure is described as follows.

The interrelationship scale is designed into a five-point scale in linguistic preferences ranging between 0 stands for no influence, 1 for very low influence, 2 for low influence), 3 for high influence, and 4 for very high influence. If a decision group has n members; take $\tilde{z}_{ij}^f$ to present the fuzzy weight of i_{th} attribute affects the j_{th} attribute assessed by f_{th} evaluators.

Normalization:

$$S = \left(s\tilde{z}_{1ij}^f, s\tilde{z}_{2ij}^f, s\tilde{z}_{3ij}^f \right) = \left(z_{1ij}^f - minz_{1ij}^f \right) / \Delta_{min}^{max} = maxz_{3ij}^f - minz_{1ij}^f \tag{1}$$

where $\Delta_{min}^{max} = maxz_{3ij}^f - minz_{1ij}^f$.

Compute left (*lt*) and right (*rt*) normalized value:

$$\left(slt_{ij}^n, srt_{ij}^n \right) = \left(sz_{2ij}^f / \left(1 + sz_{2ij}^f - sz_{1ij}^f \right), sz_{3ij}^f / \left(1 + sz_{3ij}^f - sz_{2ij}^f \right) \right) \tag{2}$$

Total normalized crisp value

$$s_{ij}^f = \left[slt_{ij}^f \left(1 - slt_{ij}^n \right) + \left(srt_{ij}^f \right)^2 \right] / \left(1 + slt_{ij}^f - srt_{ij}^f \right) \tag{3}$$

The subjective judgment for n evaluators is aggregated the synthetic value using the equation below:

$$\tilde{z}_{ij}^f = \frac{1}{f} \left(\tilde{z}_{ij}^1 + \tilde{z}_{ij}^2 + \tilde{z}_{ij}^3 + \ldots + \tilde{z}_{ij}^f \right) \tag{4}$$

Define an initial direct relation matrix (IDRM), a $n \times n$ matrix obtained by pair-wise comparisons. In matrix IDRM, z_{ij} has been denoted as the degree to which the criterion i affects the criterion j, i.e., $\text{IDRM} = \left[\tilde{z}_{ij}^f \right]_{n \times n}$.

Standardizing the direct relation matrix IDRM—Using matrix *F* to obtain matrix *X* by multiplying matrix *Z* with ω.

$$X = \omega \times Z \tag{5}$$

where $\omega = \frac{1}{\max\limits_{1 \le i \le f} \sum_{j=1}^{f} \tilde{z}_{ij}^{f}}$.

The total relation matrix (*X*) is obtained and uses matrix *X* to calculate the total relation matrix *Y*.

$$Y = \lim_{f \to \infty} \left(X + X^2 + \ldots + X^f \right)^n = X(1 - X)^{-1} \tag{6}$$

A causal diagram- the vector D represents the sum of rows and vector R represents the sum of columns within the total relation matrix U. A causal and effect group can be designed by mapping with (D + R, D − R). The horizontal axis vector (D + R) has been given the name "Prominence." The vertical axis (D − R) has been given the name "Relation." When the sum of (D − R) is negative, the criterion is grouped into the effect group, and when the sum of (D − R) is positive, the criterion falls into the effect group

$$X = \left[X_{ij} \right]_{n \times n} i, j = 1, 2, \ldots, n \tag{7}$$

$$D = \left[\sum_{i-1}^{n} X_{ij} \right]_{n \times n} = [X_i]_{n \times 1} \tag{8}$$

$$R = \left[\sum_{j-1}^{n} X_{ij} \right]_{n \times n} = [X]_{1 \times n} \tag{9}$$

4. Results

4.1. Interrelationships Among Aspects

Table 3 shows the defuzzification process and transforms the TFN into crisp value using Equations (1)–(3). The crisp values (ncv_{ij}^{k}) are aggregated into the initial direct relation matrix (IDM) Using Equation (4).

Table 3. Aspect total direct relation matrix.

| Aspects	A1	A2	A3	A4	A5	R
A1 Social Impact	2.835	2.737	2.612	2.806	2.642	13.632
A2 Environmental Management	2.856	2.952	2.735	2.947	2.775	14.264
A3 Economic Performance	3.034	3.007	2.901	3.163	2.989	15.094
A4 Market Risks	3.128	3.137	3.026	3.317	3.057	15.665
A5 Corporate Governance	3.192	3.218	3.094	3.329	3.217	16.049
D	15.045	15.050	14.368	15.561	14.680	2.988

Table 4 provided the aspect's interrelationships. The highest (D − R) refers to the highest influence relation among aspects, while (D + R) refers to the strength of influence among aspects. Corporate governance (A5), economic performance (A3), and market risks (A4) are classified in the cause aspects group. Social impact (A1) and environmental management (A2) are categorized in the effect group.

Figure 1 visualized that corporate governance (A5), economic performance (A3), and market risks (A4) are categorized in the cause group, while the social impact (A1) and environmental management (A2) are categorized in the effect group. Specifically, market risk possesses low effect on corporate governance and has a medium effect on economic performance. Economic performance as well is affected by corporate governance and market risks in medium degree. Furthermore, market risks are affected by corporate governance in a modest way, and it has medium relations with economic performance.

Table 4. The aspect's prominence and relation axis for cause and effect group.

Aspects.	D	R	D + R	D − R
A1 Social Impact	15.045	13.632	28.677	(1.413)
A2 Environmental Management	15.050	14.264	29.314	(0.786)
A3 Economic Performance	14.368	15.094	29.462	0.725
A4 Market Risks	15.561	15.665	31.226	0.104
A5 Corporate Governance	14.680	16.049	30.729	1.370

"()" means negative number.
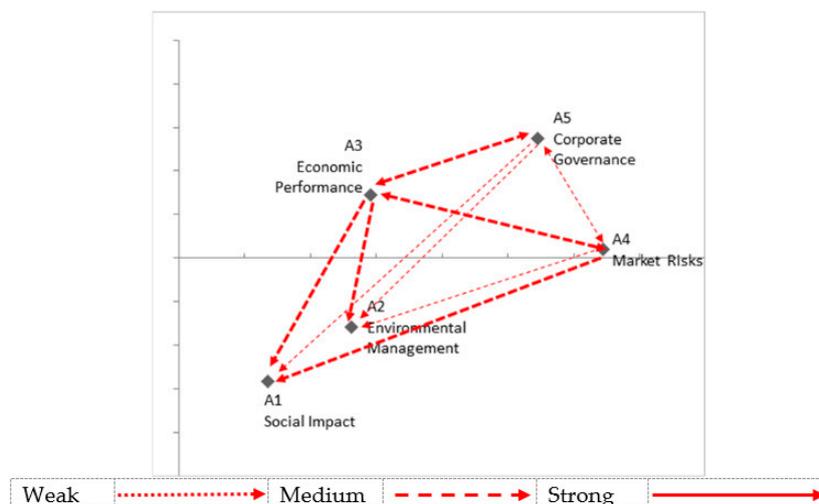
Figure 1. Aspect's causal effect.

4.2. Causal Criteria Group

Tables 5 and 6 repeated the equations to arrive the total relation matrix (TIM) and generate the criteria horizontal "Prominence" axis and "Relation" vertical axis for displaying the cause and effect relation.

Table 7 shows the results of the cause-effect relationship on sustainable investment criteria. This study found that Transparency and Anti-Corruption (C18) and Board Diversity (C20) were the two most important criteria of Corporate Governance (A5) based on the first and the eight highest (D + R) values of 16.921 and 15.812, whereas both Transparency and Anti-Corruption (C18) and Board Diversity (C20) were in the cause group based on their positive (D-R) values of 0.212 and 0.281. Furthermore, Excess Return (C13), Market Value (C12), and Shareholder Loyalty (C11) were the three most important criteria of Economic Performance (A3) aspect based on higher (D + R) values of 16.849, 16.809, and 16.642. They were also the net cause group with higher positive values of (D − R) such as 0.565, 1.102, and 0.212.

Figure 2 showed the cause and effect group. There are 9 criteria in the cause group (C1, C2, C3, C4, C5, C6, C7, C11, C12, C13, C16, and C18) and the effect group includes C8, C9, C10, C14, C15, C17, C19, C20, and C21. The top 5 criteria in the causal group is a priority for practices.

Figure 2 displays the interrelationships among the criteria of sustainable investment. It shows that nine out of twenty-one criteria are in the driving quadrant (Quadrant I) which has a strong influence on other criteria. Thus, this study focuses on those nine criteria such as Transparency and Anti-Corruption (C18), Excess Return (C13), Market Value (C12), Shareholder Loyalty (C11), Emissions Reduction (C7), Product Responsibility (C4), Resource Reduction (C6), Employment Quality (C1), and Board Diversity (C20) to describe the managerial implications. Moreover, this study brings up the solutions to improve sustainable investment performance in order to attract more investors.

Table 5. Criteria total direct relation matrix.

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21
C1	0.7967	0.6488	0.5599	0.5989	0.4845	0.4458	0.6164	0.5824	0.5726	0.5555	0.5514	0.5127	0.4516	0.3873	0.4035	0.3220	0.5416	0.6000	0.4073	0.4881	0.6136
C2	0.5498	0.7650	0.5413	0.5049	0.4470	0.3104	0.5398	0.4286	0.5538	0.5569	0.4578	0.3578	0.3709	0.4095	0.3472	0.4982	0.5256	0.5659	0.4257	0.5446	0.4186
C3	0.4568	0.4963	0.8199	0.5201	0.5789	0.4073	0.5216	0.5473	0.5515	0.4917	0.3806	0.3517	0.3693	0.4837	0.4460	0.4572	0.5425	0.6221	0.3885	0.4257	0.4586
C4	0.5494	0.5136	0.5387	0.7782	0.5585	0.5373	0.5981	0.5435	0.5897	0.5974	0.5325	0.5060	0.5220	0.5026	0.4616	0.4730	0.4073	0.5047	0.5021	0.4873	0.6334
C5	0.4762	0.4385	0.3685	0.3510	0.8176	0.4820	0.4227	0.4219	0.4961	0.5558	0.4980	0.4309	0.4493	0.3293	0.2331	0.4358	0.4626	0.5461	0.4468	0.4315	0.3635
C6	0.5155	0.5196	0.4651	0.5014	0.4260	0.8100	0.5789	0.5626	0.6288	0.5986	0.4778	0.4731	0.5835	0.4649	0.4430	0.4170	0.4825	0.4659	0.4857	0.5664	0.5544
C7	0.4783	0.5535	0.5376	0.5427	0.5214	0.5626	0.8046	0.5262	0.6274	0.6196	0.4954	0.5640	0.5621	0.5003	0.4635	0.5335	0.4470	0.4669	0.4860	0.4509	0.4589
C8	0.5148	0.4610	0.5017	0.5196	0.4633	0.4836	0.4623	0.7940	0.6122	0.5588	0.5352	0.4918	0.5238	0.4079	0.4449	0.5135	0.5213	0.4687	0.4851	0.5480	0.5185
C9	0.4748	0.4786	0.5600	0.5778	0.3873	0.4229	0.5178	0.5036	0.8247	0.6391	0.5340	0.5076	0.5620	0.4649	0.4443	0.4972	0.4848	0.5832	0.5210	0.5628	0.5521
C10	0.5702	0.4759	0.4449	0.5795	0.5994	0.5810	0.5939	0.6332	0.6310	0.8576	0.5191	0.4727	0.6013	0.4244	0.4035	0.4353	0.3881	0.5308	0.5612	0.5280	0.5946
C11	0.4738	0.4211	0.2917	0.5014	0.4609	0.5956	0.5755	0.5633	0.5750	0.6032	0.7734	0.4937	0.5649	0.5200	0.4251	0.5150	0.5217	0.6619	0.5432	0.5472	0.5162
C12	0.4806	0.4629	0.4469	0.5976	0.4448	0.5585	0.6341	0.6132	0.5526	0.5956	0.6491	0.7828	0.5824	0.4832	0.5224	0.4940	0.5614	0.6027	0.5597	0.5846	0.6324
C13	0.5519	0.4807	0.3879	0.5799	0.4669	0.5962	0.5601	0.6321	0.6137	0.6206	0.6140	0.5863	0.7805	0.5189	0.5415	0.4935	0.5590	0.5706	0.5048	0.3954	0.4407
C14	0.2478	0.3500	0.2155	0.3334	0.2348	0.4457	0.4808	0.3556	0.4193	0.4290	0.3049	0.3752	0.3682	0.8100	0.5013	0.4526	0.4623	0.3925	0.3474	0.3722	0.3614
C15	0.3012	0.3631	0.2163	0.3484	0.3277	0.4417	0.4035	0.3916	0.4757	0.4528	0.4960	0.4554	0.4453	0.6341	0.8069	0.4737	0.6351	0.3553	0.3100	0.3879	0.3409
C16	0.4004	0.4429	0.2931	0.4835	0.3082	0.5567	0.5186	0.4777	0.5716	0.4916	0.5536	0.5276	0.5613	0.5578	0.5194	0.7914	0.6352	0.4306	0.4829	0.3524	0.4569
C17	0.4750	0.4578	0.3673	0.4273	0.3683	0.5008	0.4422	0.4671	0.5150	0.4038	0.4764	0.4718	0.4837	0.5010	0.5401	0.5331	0.8046	0.3363	0.4454	0.4887	0.4207
C18	0.5725	0.5338	0.4825	0.5573	0.4823	0.4975	0.4781	0.5618	0.6086	0.6005	0.6128	0.5677	0.5814	0.4435	0.4636	0.3970	0.4243	0.8372	0.5026	0.4863	0.6311
C19	0.3995	0.4240	0.2904	0.3526	0.2918	0.4457	0.3483	0.5096	0.3796	0.4317	0.4040	0.5330	0.4676	0.4047	0.4242	0.4919	0.5578	0.5085	0.8176	0.3918	0.4570
C20	0.4157	0.5132	0.4620	0.5250	0.4044	0.5400	0.4437	0.5870	0.5332	0.5810	0.5364	0.4539	0.5037	0.4619	0.4612	0.4178	0.4811	0.5657	0.5022	0.8146	0.4566
C21	0.3983	0.3614	0.3661	0.4661	0.3676	0.3855	0.2717	0.4331	0.4572	0.4726	0.4759	0.4919	0.4262	0.2712	0.3277	0.3206	0.2712	0.4691	0.4070	0.4318	0.8604

Table 6. The criteria's prominence and relation axis for cause and effect group.

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14	C15	C16	C17	C18	C19	C20	C21	D
C1	0.4123	0.4004	0.3595	0.4144	0.3616	0.3977	0.4201	0.4290	0.4508	0.4469	0.4172	0.3973	0.4049	0.3692	0.3591	0.3639	0.4072	0.4281	0.3790	0.3918	0.4193	8.4296
C2	0.3582	0.3776	0.3281	0.3716	0.3277	0.3518	0.3786	0.3795	0.4110	0.4090	0.3738	0.3502	0.3631	0.3396	0.3236	0.3476	0.3719	0.3893	0.3481	0.3632	0.3670	7.6305
C3	0.3545	0.3588	0.3562	0.3774	0.3436	0.3651	0.3817	0.3947	0.4162	0.4085	0.3719	0.3543	0.3678	0.3508	0.3367	0.3486	0.3783	0.3990	0.3492	0.3574	0.3753	7.7461
C4	0.3953	0.3930	0.3613	0.4345	0.3722	0.4111	0.4236	0.4308	0.4578	0.4562	0.4206	0.4018	0.4164	0.3843	0.3689	0.3819	0.4006	0.4248	0.3923	0.3962	0.4259	8.5496
C5	0.3323	0.3295	0.2947	0.3372	0.3417	0.3467	0.3474	0.3574	0.3830	0.3863	0.3564	0.3366	0.3494	0.3129	0.2947	0.3228	0.3457	0.3662	0.3306	0.3335	0.3413	7.1464
C6	0.3834	0.3846	0.3468	0.4013	0.3520	0.4254	0.4123	0.4227	0.4509	0.4459	0.4062	0.3897	0.4124	0.3723	0.3591	0.3683	0.3979	0.4114	0.3819	0.3942	0.4093	8.3280
C7	0.3859	0.3933	0.3582	0.4109	0.3659	0.4102	0.4382	0.4258	0.4575	0.4544	0.4140	0.4036	0.4167	0.3814	0.3664	0.3844	0.4012	0.4178	0.3877	0.3898	0.4069	8.4701
C8	0.3773	0.3733	0.3443	0.3964	0.3496	0.3908	0.3956	0.4360	0.4422	0.4352	0.4049	0.3852	0.4007	0.3615	0.3535	0.3709	0.3952	0.4051	0.3758	0.3864	0.3997	8.1794
C9	0.3824	0.3835	0.3573	0.4108	0.3511	0.3946	0.4097	0.4205	0.4707	0.4524	0.4141	0.3955	0.4133	0.3751	0.3618	0.3780	0.4009	0.4248	0.3877	0.3964	0.4121	8.3927
C10	0.4016	0.3940	0.3569	0.4219	0.3798	0.4195	0.4276	0.4435	0.4664	0.4836	0.4241	0.4034	0.4280	0.3812	0.3675	0.3826	0.4031	0.4317	0.4019	0.4041	0.4270	8.6492
C11	0.3838	0.3799	0.3346	0.4053	0.3585	0.4116	0.4163	0.4273	0.4508	0.4509	0.4364	0.3961	0.4155	0.3813	0.3615	0.3809	0.4056	0.4328	0.3913	0.3966	0.4104	8.4271
C12	0.4057	0.4050	0.3677	0.4365	0.3772	0.4308	0.4443	0.4554	0.4739	0.4752	0.4489	0.4431	0.4397	0.3992	0.3904	0.4002	0.4317	0.4513	0.4142	0.4217	0.4435	8.9557
C13	0.4021	0.3966	0.3535	0.4243	0.3698	0.4235	0.4275	0.4458	0.4676	0.4657	0.4350	0.4158	0.4460	0.3926	0.3826	0.3904	0.4212	0.4373	0.3992	0.3949	0.4159	8.7074
C14	0.2703	0.2802	0.2434	0.2921	0.2516	0.3008	0.3086	0.3059	0.3283	0.3272	0.2951	0.2897	0.2987	0.3161	0.2808	0.2847	0.3031	0.3067	0.2804	0.2863	0.2971	6.1473
C15	0.3000	0.3063	0.2657	0.3197	0.2830	0.3269	0.3287	0.3367	0.3625	0.3583	0.3390	0.3225	0.3322	0.3258	0.3311	0.3113	0.3450	0.3308	0.3022	0.3133	0.3218	6.7626
C16	0.3529	0.3574	0.3125	0.3782	0.3222	0.3829	0.3858	0.3929	0.4223	0.4128	0.3914	0.3742	0.3893	0.3617	0.3476	0.3817	0.3909	0.3857	0.3616	0.3548	0.3792	7.8380
C17	0.3433	0.3428	0.3047	0.3562	0.3127	0.3609	0.3618	0.3742	0.3984	0.3864	0.3672	0.3525	0.3650	0.3409	0.3340	0.3435	0.3887	0.3600	0.3420	0.3505	0.3586	7.4443
C18	0.3983	0.3955	0.3570	0.4165	0.3662	0.4084	0.4139	0.4335	0.4604	0.4574	0.4288	0.4082	0.4226	0.3798	0.3699	0.3759	0.4029	0.4547	0.3932	0.3971	0.4269	8.5671
C19	0.3189	0.3216	0.2815	0.3306	0.2891	0.3371	0.3339	0.3582	0.3653	0.3677	0.3416	0.3396	0.3445	0.3142	0.3066	0.3220	0.3482	0.3554	0.3565	0.3235	0.3430	6.9990
C20	0.3632	0.3725	0.3359	0.3911	0.3394	0.3901	0.3882	0.4123	0.4290	0.4309	0.3991	0.3762	0.3932	0.3611	0.3499	0.3572	0.3859	0.4077	0.3720	0.4041	0.3885	8.0473
C21	0.3018	0.2988	0.2733	0.3228	0.2805	0.3134	0.3086	0.3326	0.3520	0.3517	0.3294	0.3179	0.3223	0.2847	0.2809	0.2893	0.3038	0.3338	0.3035	0.3097	0.3603	6.5710
R	7.6234	7.6446	6.8931	8.0497	7.0953	7.9993	8.1522	8.4147	8.9170	8.8627	8.2150	7.8535	8.1416	7.4857	7.2267	7.4861	8.0292	8.3543	7.6501	7.7655	8.1289	0.3764

Table 7. The criteria prominence and relation axis for cause and effect group.

	D	R	D + R	D − R
C1	8.4296	7.6234	16.0530	0.8062
C2	7.6305	7.6446	15.2751	(0.0142)
C3	7.7461	6.8931	14.6391	0.8530
C4	8.5496	8.0497	16.5993	0.5000
C5	7.1464	7.0953	14.2417	0.0511
C6	8.3280	7.9993	16.3273	0.3286
C7	8.4701	8.1522	16.6223	0.3179
C8	8.1794	8.4147	16.5941	(0.2352)
C9	8.3927	8.9170	17.3097	(0.5243)
C10	8.6492	8.8627	17.5119	(0.2135)
C11	8.4271	8.2150	16.6421	0.2121
C12	8.9557	7.8535	16.8091	1.1022
C13	8.7074	8.1416	16.8490	0.5659
C14	6.1473	7.4857	13.6330	(1.3383)
C15	6.7626	7.2267	13.9893	(0.4641)
C16	7.8380	7.4861	15.3241	0.3520
C17	7.4443	8.0292	15.4735	(0.5849)
C18	8.5671	8.3543	16.9214	0.2129
C19	6.9990	7.6501	14.6491	(0.6511)
C20	8.0473	7.7655	15.8129	0.2818
C21	6.5710	8.1289	14.6999	(1.5579)
Max			17.5119	1.1022
Min			13.6330	(1.5579)
Average			15.8084	0.0000

"()" means negative number.
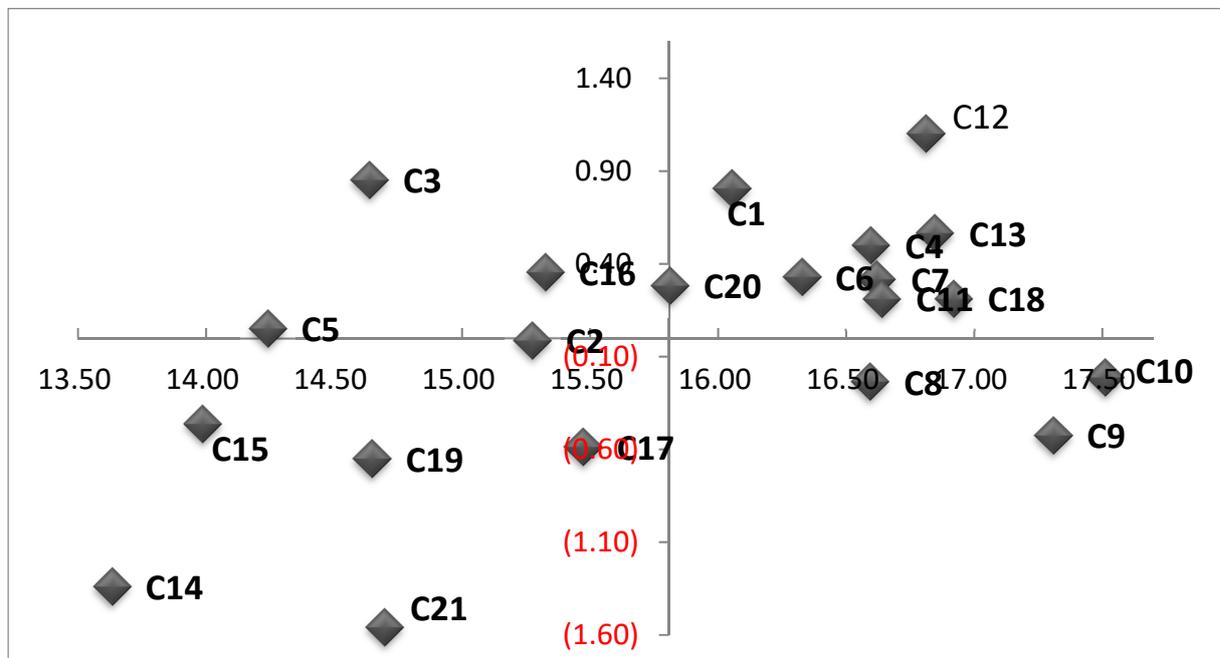
Figure 2. Criteria causal and effect diagram.

5. Implications

This section presents the theoretical and practical implications.

5.1. Theoretical Implications

This study presented the interrelationship among aspects. The aspect causal result presented the interrelated among corporate governance, economic performance, and market risks, especially, the cause group are related to their influence on the effect group. Corporate governance (A5) is the highest relation to influence the economic performance, market risks and others in sustainable investment. Corporate governance is the main attribute to develop and improve sustainable investment. Previous studies argued that the corporate governance had a positive effect on financial performance [3,33]. This attracts investors of sustainable investments. Corporate governance impacts upon economic performance and reduces market risks.

Economic performance (A3) covers the investor preferences on the firm's sustainable investment and has a strong influence on corporate governance and market risks. The firms can maintain and increase their economic performance simultaneously. The causal effect improves corporate governance and mitigates market risks. Economic performance makes firms obtain more capital from investment. The sustainable investor fund's asset allocation decisions are driven by economic performance and corporate governance [4,40]. Lastly, market risks and economic performance are interrelated. The higher market risks and higher economic performance are for higher returns. The market risks might affect the investor decision that concerns the high risks for their investment. Nevertheless, low market risks will also make the market sluggish. Hence, the stability of market risks is important for sustainable investment performance in the long-term [29,40].

5.2. Practical Implications

The investor's preferences on sustainable investment are for the firms to improve their ESG in practices. Transparency and anti-corruption (C18) drive investors to choose sustainable investment as their portfolio investment. Transparency and anti-corruption have the highest influence on others, as the investor highly regard the firm that is free of corruption and demonstrates transparency in the financial, policy, and management dimensions. Non-transparency and corruption problems cause management conflict, generate unstable profit margin, devaluate market value and degrading shareholder loyalty. These are criteria that lead to high investor turnover from sustainable investment. Such turnover can be prevented by reporting financial statements, new firm policies, and managerial reports to investors regularly. Furthermore, financial auditing from a credible institution and an anti-corruption campaign can strengthen the firm's control and mitigate corruption.

Investors consider earning a high profit and a high excess return (C13) from their investment and increase the market value (C12). However, firm profit affects shareholder loyalty (C11). The increasing profit leads the firm to create more investment in production and human resources. In contrast, decreasing profit affects employee efficiency, executive pay, and corporate responsibility programs. However, the investment which has a high return always has a high risk. Most investors tend to gain high returns, and rationally the investors consider the risks. The firm listed in the SRI must be able to mitigate the risks while having good returns for their investors. Moreover, market value affects the willingness of investors to invest their money in the firms. As the market value is the firm value rated by the market itself, the investors tend to buy the firm's stocks which have a high valuation in the market. Investors consider the ESG firm that performs well and who has good loyalty. When the shareholder of a firm is loyal that means the investors gain the dividends from their stocks. However, not all the firms which earn profits want to share the dividend, and therefore, shareholder loyalty becomes the most important aspect for the sustainable investors.

Corporate governance affects environmental management. Emission reduction (C7) and resource reduction (C6) are under environmental management. Reducing emissions (C7) leads to the improvement of the firm's quality and it significantly affects the market value and excess return. However, reducing emissions requires both additional and high investment. The results suggest that another way to increase the market value and excess return is through resource reduction (C6) as resource reduction means efficiency in raw material input and operational costs. This efficiency

decreases the production cost and increases the profit margin of the firm. The increasing profit margin positively affects the increasing excess return and enhances the market value of a firm listed in SRI.

Products and services produced by the listed firms are a large concern for sustainable investors. To maintain sustainable investors, the firms should produce the products and services on the ESG. The product responsibility (C4) covers the whole life cycle from the use of raw materials, product development, production, distribution, product use to the recycling system. The employment quality (C1) is important to firms' ESG management activities. However, the employment quality raises productivity, and the firms should improve the executive pay/compensation policy and healthcare facilities. This improvement also requires the firm's investment if the practice becomes a dilemma due to limited investments and resources. However, sufficient health and living conditions create more productivity and generate dynamic creativity for responding to the sustainable investor's feedback in the long-term firm period.

6. Conclusions

The sustainable investment attributes are analyzed using fuzzy set theory and DEMATEL methods to explain the interrelationships among aspects and criteria based on investor preferences. Sustainable investment is rapidly growing due to the improvement of investor awareness on sustainability issues. Sustainable investment has been released to identify aspects that affect sustainable investment. This study examined the attributes with interrelationships and ESG qualitative information for sustainable investment using investor preferences. The ESG is used interchangeably to cover a wide spectrum of firms' strategies toward sustainable investment. Ethical screens eliminate firms engaged in controversial operational activities and reflects the firm's values and this, therefore, improved investment returns. Sustainable investment is approached thoughtfully and integrated with traditional analysis, and improves insights and enhances performance.

This study fulfills the investor's approach in which a set of ESG related attributes are considered, in addition to traditional financial analysis. This study leads to the understanding of investor preferences on the ESG that firms' operates with and their performance in attracting stakeholders. In addition, this study provides a more complete understanding of ESG attribute to traditional statistical analysis. In practice, the results show how this attribute integration is approached and can be implemented. The findings show that corporate governance drives social impact and environmental management to improve the sustainable investment in investor preferences. The examination of firms' environmental, social, and governance performances are designed in this proposed approach in linguistic preferences. The result indicates that the improvement criteria lead to a better performance due to those attributes that are performed in sustainable ESG investment. The results are an important contribution to investors and firms' ESG activities, especially if the firm has transparency and anti-corruption issues. The ESG performed firm is the best choice for investors and the portfolio manager in allocating assets on sustainable investments and reduces the market risks. Investors must consider the sustainable investment that gives high excess returns, high market value, and excellent shareholder loyalty.

There are several limitations. For instance, ESG firms are measured in qualitative information. There are still quantitative data to be included in the assessment although the interrelationships among the attributes are addressed. Still, the hierarchical structure is ignored in this assessment due to the method limitations. This study adopts the content validity, but perhaps the reliability and construct validity need to be enhanced in future studies. The sample size is limited in the current study. Future studies could enlarge the sample size or analyses of the cross-sector study.

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