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Non-financial Capital Value Creation: Assessing Japan's Path to an ESG-Friendly Economy Through the Yanagi's Model

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Abstract: This paper explores the possibility of Japan adopting the Non-Financial Capital and Equity Spread Synchronization Model, also known as the Yanagi's model, to build an environmental, social, and governance (ESG)-friendly economy. The Yanagi's model focuses on incorporating non-financial elements, such as ESG factors, into companies' traditional financial performance measures. By doing so, the model aims to enhance firms' long-term sustainability and value creation. This paper assesses the potential benefits and challenges of implementing the Yanagi's model in the Japanese context through a review of relevant literature and case studies. The literature suggests that integrating ESG factors can lead to improved financial performance, reduced risk, and increased reputation for companies. However, there are also concerns about the lack of standardization and transparency in ESG data, as well as the potential for greenwashing or superficial adoption of ESG practices. Despite these challenges, this paper argues that the Yanagi's model could serve as a viable path for Japan to build an ESG-friendly economy, given the country's recent push for sustainability and the growing demand for socially responsible investments. This paper suggests several recommendations for improving the model, such as increasing transparency and standardization in ESG data, enhancing stakeholder engagement, and promoting a culture of long-term value creation. Overall, this paper concludes that while there are challenges to adopting the Yanagi's model, its potential benefits for building a sustainable and ESG-friendly economy in Japan make it a worthwhile pursuit.

Keywords: sustainable finance, Yanagi's model, stewardship engagement, ESG investing, macroeconomic growth, Japan, impact valuation

1. Introduction

The significance of environmental, social, and governance (ESG) practices has received considerable attention in the context of global attempts to attain the Sustainable Development Goals (SDG) by 2030 [1, 2]. Notably, Japanese businesses have adopted ESG concepts and shown dedication to a variety of areas, including community welfare, environmentally friendly manufacturing, client-centered services, and product safety [3]. Japan is a suitable candidate for the incorporation of ESG principles into strategic and operational choices because of its extensive history and the fact that it is home to more than 40% of the century-old firms in the globe [3]. Japan has created a comprehensive strategy that is informed by the 2030 Agenda for Sustainable Development and focuses on people, prosperity, planet, peace, and partnership [3]. Despite admirable development, there are still significant gaps, notably in crucial areas like active ownership, stewardship engagement, and taking into account non-tangible elements that affect business value. Significant manifestations of these issues can be seen in the areas of environment [E], social [S], and governance [G].

Underscoring its commitment to environmental preservation is Japan's admirable goal of achieving net-zero emissions by 2050 [4]. Due to the slow adoption of renewable energy sources and the continued usage of coal-fired power plants, the rate of greenhouse gas emission reduction confronts difficulties [4]. The challenges that Japan faces are highlighted by its struggle to strike a balance between energy security and decarbonization. Japan faces difficulties in retaining talent due to its aging and declining population in terms of social inclusion and diversity.

Corporate governance is still a major topic of discussion, with Japanese companies lagging behind their international counterparts because of issues including the lack of independent board members and the practice of "cross-shareholding" [5, 6]. The Stewardship and Corporate Governance codes [7] and other initiatives have advanced governance standards and sustainability practises, but more work is required, including the creation of sustainability committees and the alignment of management compensation with ESG performance.

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The importance of determining the causes of Japanese companies' unusually low price-to-book ratios (PBRs), which span industries including automotive, electronics, and manufacturing, is highlighted by the fact that they are significant on a global scale. Japanese businesses separate out from their regional competitors by practicing cautious financial management and stakeholder-focused governance [8].

To examine how the Yanagi's model might improve the current framework in Japan, this research conducts a thorough analysis of the body of existing literature and employs qualitative data collection methodologies. The Yanagi's model's potential to advance the SDG is evaluated, with an emphasis on its applicability in the Japanese context [8]. This research aims to provide insights useful not only to Japan but also to other countries trying to implement ESG efforts by putting light on the Yanagi's model's success in promoting sustainable business practices in Japan. This investigation is in line with the growing importance of ESG practices and the pressing requirement for Japanese businesses to adopt sustainable development plans.

2. Research Methodology

Given this background, this study aims to investigate the effectiveness of the Yanagi's model in revitalizing the struggling Japanese economy. This research aims to provide a comprehensive and critical review of Yanagi's research on non-financial capital and equity spread synchronization by analyzing four key pillars of research. These pillars include:

1) Synchronization model of non-financial capital and equity spread
2) Empirical studies conducted
3) Importance of disclosing ESG finances
4) Engagement in firms as a decisive factor

Therefore, this paper seeks to examine the impacts of implementing the Yanagi's model within a larger framework on the Japanese economy. The Yanagi's model emphasizes sustainability and social responsibility in economic development, and this research will assess its potential impact on Japan's economy. Moreover, this study aims to contribute to the existing literature on ESG investments at both micro and macro levels. By incorporating the Yanagi's model into the analysis, this research aims to provide a unique perspective on how ESG investments can promote sustainable economic growth.

The methodology for this study involved a mixed-methods approach that combines a comprehensive literature review of the existing literature on Yanagi's research, including theoretical and empirical articles, academic books, and other pertinent sources. The sources to review were selected adhering to the PRISMA guidelines (Figure A1 [9]). The interview with Dr. Yanagi followed a semi-structured approach, allowing for open-ended questions to gather rich and detailed information. Further, a critical analysis approach was utilized to evaluate the strengths and limitations of each of the four pillars of research. The findings of this study will be presented in a descriptive and narrative form, providing a detailed overview of the effectiveness of the Yanagi's model in revitalizing the struggling Japanese economy, which can inform policy decisions and business practices in Japan and other countries, providing valuable contributions to academic literature.

3. Yanagi's Model: A Conceptual Review

Dr. Ryohei Yanagi, former chief financial officer at the Japanese pharmaceutical company Eisai, has developed a model that quantifies the impact of ESG factors on a company's financial performance. The Yanagi's model is an efficient formula that endeavors to establish a correlation between ESG indicators and the value of Japanese companies. Yanagi was ahead of his time in his research, especially when ESG and sustainable investing were not as popular as they are today. Furthermore, his extensive experience in the corporate governance of Japan helped him create the model, built on the belief that ESG and non-financial reporting are on the rise. A detailed explanation of the model is given as Figure 1 [10] below.

The Non-Financial Capital and Equity Spread Synchronization Model is a conceptual framework that seeks to explain the relationship between non-financial capital and the value of a company's equity. This model postulates that the value of a company's equity is a function of the synchronicity between the company's non-financial capital and the spread between its ROE and the cost of equity (COE) [11]. In this model, non-financial capital is defined as the intangible assets of a company, such as its brand reputation, innovation capabilities, human capital, and relationships with stakeholders. The equity spread, on the other hand, is the difference between a company's ROE and its COE and reflects the excess returns that a company generates over its cost of capital. The greater the equity spread, the higher the value of a company's equity.

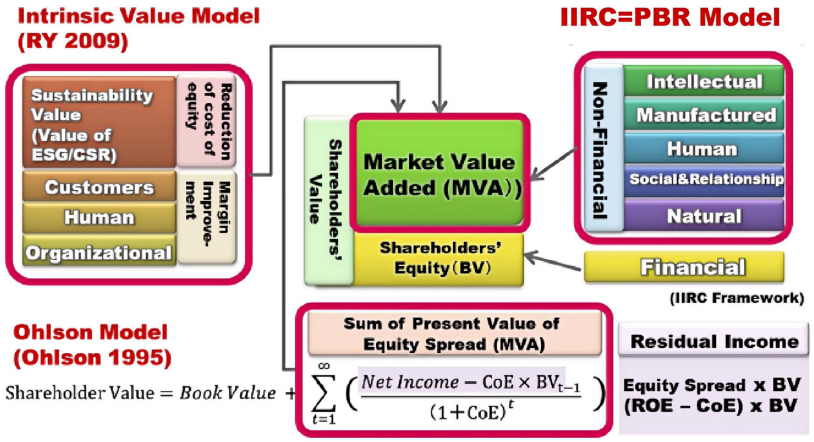
According to Yanagi's model, the synchronization between a company's non-financial capital and its equity spread is a key determinant of its market value added (MVA), which is the materialization of non-financial capital. MVA represents the difference between the market value of a company's equity and the book value of its equity. In other words, MVA measures the value that investors place on a company's non-financial capital [12]. The breakdown of the PBR is a key element in Yanagi's model. PBR is a financial metric that reflects the market's perception of a company's non-financial capital. When a company's non-financial capital is highly valued by the market, its PBR will be correspondingly elevated. Conversely, if the market regards a company's non-financial capital unfavorably, the resultant PBR will be low [13]. Yanagi's model suggests that the breakdown of PBR can be explained by the synchronicity between a company's non-financial capital and its equity spread. The relationship between intangible assets, equity spread synchronization, and MVA can be expressed mathematically as follows:

$$\mathrm{MVA} = (\mathrm{ROE} - \mathrm{COE}) \times (\mathrm{B/V}) \times (1 - \mathrm{D/E}) \times (1 + \mathrm{E/A}) \times (1 - \mathrm{F/N}) \quad (1)$$

where MVA is the market value added; ROE is the return on equity; COE is the cost of equity; B is the book value of equity; V is the market value of equity; D is the book value of debt; E is the market value of equity+book value of debt; A is the book value of assets; F is the book value of fixed assets; N is the book value of networking capital.

This equation shows that MVA is positively related to the equity spread (ROE – COE) and the synchronicity between non-financial capital and the equity spread, as reflected in the terms (1 + E/A) and (1 – F/N). It is worth acknowledging that this equation

Figure 1
Synchronization model of non-financial capital and equity spread



operates exclusively on balance sheet inputs, a noteworthy characteristic of the Yanagi's approach.

The other terms in the equation reflect the company's capital structure and asset composition. Another interesting takeaway is his research on the relationship between cash holdings and the financial performance of Japanese companies. In his book, Yanagi [14] argues that a significant portion of the cash held by Japanese companies is leading to the destruction of financial assets. Furthermore, he posits that this is one of the reasons why foreign investors tend to undervalue Japanese companies. Despite years of positive results from the Abenomics reform, around 40% of Japan's companies have a price-to-book value ratio that is still less than one [15]. Research by Opler et al. [16] has shown that companies with limited access to capital markets tend to have high ratios of cash holdings to total assets, as seen in a sample of US companies from 1971 to 1994 [17]. Yanagi argues that this also applies in the Japanese context, where companies with high financing costs or small cash flows tend to hold large amounts of cash instead of investing it. Other factors that contribute to this trend include poor investor relations and recognition gaps due to cultural differences. Furthermore, a global investor survey conducted by Yanagi [18] found that foreign investors tend to discount the value of cash held by Japanese companies by 50%. This means that 100 Yen would only mean a value of 50. This supports the findings of quantitative research by Faulkender and Wang [19] and Dittmar and Mahrt-Smith [20], which used regression equations to estimate the extent of this discounting.

Further, ROE is a measure of how efficiently a firm makes use of its shareholder's equity to generate profits. As mentioned earlier, Japanese ROE management has been traditionally focused on long-term growth and stability as opposed to short-term gains. Some celebrated examples of the above include the "keiretsu" and "main bank" systems practiced in Japan [21, 22]. However, Japan's shareholder returns are among the worst performers, which predominantly is due to its Bank-governance system. According to Dr. Yanagi, many Japanese companies lag behind when it comes to showing the value of intangibles like employing workers with disabilities or promoting women to management positions. In recent years, nearly 341 Japanese companies have adopted integrated reporting, as per KPMG data [4, 23]. This reflects the growing trend of businesses in Japan to promote their company's intangible assets, such as human resources and social contributions, in addition to traditional financial metrics such as ROE. In this regard, the Yanagi's model aims to bridge the gap between these intangible assets and financial metrics and provide an understanding of how these assets contribute to the overall value of a company.

Thus, the "Yanagi's model," which emphasizes the importance of increasing employee training days to boost a company's valuation, has been adopted by several Japanese firms such as JR East, Eisai, NEC, KDDI, and Nissin Foods. These firms have disclosed the positive results of the Yanagi's model in their respective integrated reports. For instance, NEC reported that increasing employee training days by just 1% would lead to a 7.2% increase in its valuation over 5 years [24]. While several other companies are planning to implement the Yanagi's model, they have not yet disclosed their intentions. In addition, there is nearly ¥200trn (£1.4trn) sleeping on Japanese companies' corporate balance sheets, which has almost doubled in the past 15 years [25, 26].

To create value and raise ROE, companies can adopt several strategies. For instance, they can raise ROE temporarily by buying their own shares, but the key is whether they can sustain the increased ROE over the long term. Unless the enterprise's entity changes, high ROE will eventually return to average. Overall, the Yanagi's model presents a promising approach to improving a company's valuation and maintaining a highly motivated workforce. However, for it to be effective, companies must address underlying issues such as Bank-governance and focus on sustaining long-term ROE growth. As more companies adopt the Yanagi's model, it will be interesting to observe its impact on shareholder returns and corporate balance sheets. Lastly, Yanagi's studies have been acknowledged in several research publications including 'The Case for Impact' by Haut [27]. The model along with its effectiveness in Eisai, a Japanese pharmaceutical company, also found its mention in the final report of G7 impact taskforce.

4. Findings: Review of Empirical Studies

Dr. Ryohei Yanagi's empirical studies have revealed a positive correlation between Eisai's ESG key performance indicators (KPIs) and PBR as Figure A2 shows. This review aims to critically evaluate Yanagi's empirical studies, discussing the strengths, limitations, and implications of his research. The findings of his multiple regression

analysis are significant as it demonstrates that companies that prioritize ESG factors can achieve better financial performance. The multiple regression analysis used in the study utilized a logarithmic transformation as Figure A2 shows.

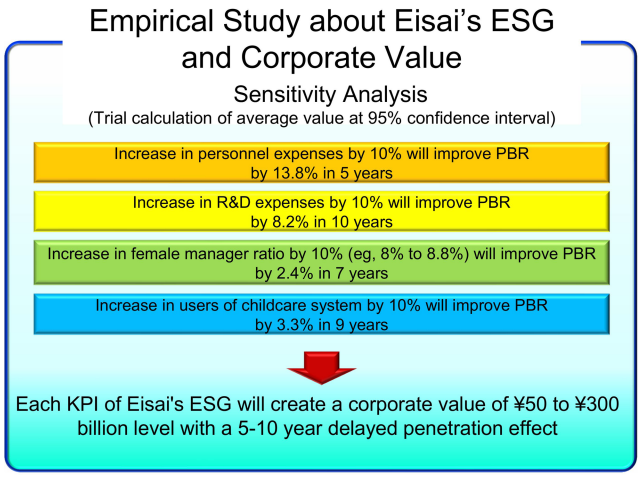
$$ln(PBR_i) = \alpha + \beta_1 \cdot ln(ROE_i) + \beta_2 \cdot ln(ESGKPI_{i-t}) + \gamma_{i-t} \quad (2)$$

where the dependent variable is denoted by PBR_i. The independent variables included: ln ROE_i and ln ESG KPI_{i-t}, with α, β_1, β_2, and γ_{i-t} as the coefficients. Wherein, α includes the factors affecting PBR_i increase, which cannot be explained with ROE or ESG. β_1 indicates the strength of the relationship between ROE and PBR. β_2 indicates the strength of the relationship between ESG KPIs and PBR.

γ_{i-t} is the difference between PBR_i estimated by regression equation and actual PBR. "i" represents the fiscal year under analysis, denoting the specific time period for which the data are being examined. "t" signifies the year for which the calculation is performed, essentially capturing the temporal aspect of the analysis.

The study as shown in Figure 2 [18] covered a wide time frame and included 88 ESG KPIs that were retroactive to an average of 12 years. A total of 1088 distinct regressions were produced as a result of the 28-year compilation of Eisai's PBR_i data. In this setting, it is crucial to understand why using individual regressions instead of a single longitudinal or panel regression is preferable. We have the chance to explore variations within these subsets because each individual regression examines a particular subset of data observations. This method, in turn, makes it easier to understand the complex connections between ESG KPIs and PBR across a range of contexts and time periods.

Figure 2
Positive correlation of Eisai's ESG KPIs and PBR



As the results are drawn from previous studies, it is prudent to mention that the reported findings are derived from these specific methodologies. Further, it might be worthwhile to think about investigating alternative regression models as a possible direction for future study [18, 28].

This is a significant sample size, and it helps to reduce the possibility of errors or bias in the study. The use of logarithmic transformation in the multiple regression analysis is also quite appropriate, as it helps to adjust for the nonlinear relationship between the variables. However, such scale should not obscure the need for rigorous data quality and the potential for biases in retrospective data collection. This is particularly crucial when dealing with historical ESG KPIs and PBR figures, where data accuracy and consistency might be questionable. Additionally, while the analysis might boast numerical sophistication, it could inadvertently overshadow critical qualitative aspects that play a pivotal role in understanding the contextual relevance of ESG practices. Moreover, the use of logarithmic transformation, while theoretically sound, can introduce assumptions that might not entirely align with the complex reality of financial markets.

Different weightings were assigned to various ESG factors, and the analysis results indicate that spending on employee development, such as pay and training, can positively impact a company's value over time. For example, Yanagi found that increasing investment in employees by 10% would result in a 13.8% increase in Eisai's price-to-book value ratio over 5 years. Similarly, increasing research and development spending by 10% would result in an 8.2% improvement in the ratio over 10 years. Yanagi argues that his model can help investors evaluate a company's ESG efforts by providing concrete numerical evidence, especially in a market where there are unregulated calculations of ESG metrics by various data providers. The Yanagi's model is particularly relevant as regulators are increasingly focusing on ESG issues. Given below is a figure that shows the positive correlation between Eisai's ESG KPIs and PBR explained above. While the model has been tested in various studies, what makes Yanagi's work stand out is the delayed penetration effect as Figure A3 [10] shows, which suggests that companies that improve their ESG and SDG performance can experience positive financial performance in the long run. Further, an empirical study conducted by Yanagi and Yoshino [29] in Japan further supports the Non-Financial Capital and Equity Spread Synchronization Model. The study found that a company's human, organizational, and relational capital had a positive and significant impact on its MVA and equity spread. In particular, the study found that a company's organizational capital, which refers to the systems, processes, and structures that enable the company to operate effectively, had the strongest impact on its MVA and equity spread. In summation, Yanagi's proposition that his model offers investors a clear path to evaluating a company's ESG endeavors demands closer examination. While quantifiable metrics can indeed provide insight, the danger arises when a single model is wielded as a universal yardstick for evaluating diverse companies across sectors. The diverse nature of industries, market conditions, and business models suggests that a one-size-fits-all approach may not be accurate or meaningful in capturing the nuances of ESG performance.

5. Discussion

5.1. Current asset managers/owners incorporation of ESG investment thesis

It is crucial to understand how current asset managers and owners incorporate ESG investment thesis in Japan before implementing the Non-Financial Capital and Equity Spread Synchronization Model widespread across Japanese companies. There are several reasons for this. First, the ESG investment approach has gained significant traction in Japan in recent years. Institutional investors are increasingly integrating ESG factors into their investment strategies [30]. As a result, understanding how asset managers and owners incorporate ESG investment thesis is essential to align the Non-Financial Capital and Equity Spread Synchronization Model with their investment strategies.

Second, Japanese companies have unique cultural, social, and legal contexts that influence how they incorporate ESG factors. For instance, Japanese companies have historically prioritized stakeholder relationships and long-term value creation over short-term profits [31]. Therefore, incorporating ESG factors may not be a radical shift for Japanese companies as it aligns with their values and culture. However, the specific ESG factors that Japanese asset managers and owners prioritize may differ from those in other countries. Thus, incorporating the specific ESG factors that Japanese asset managers and owners prioritize is critical for the effective implementation of the Non-Financial Capital and Equity Spread Synchronization Model.

Further, understanding how asset managers and owners incorporate ESG investment thesis in Japan is essential for ensuring that the implementation of the Non-Financial Capital and Equity Spread Synchronization Model aligns with the broader national goals and regulatory frameworks. For instance, Japan's Stewardship Code and Corporate Governance Code outline expectations for institutional investors to engage with investee companies on ESG issues [32]. Incorporating ESG factors that align with the Stewardship Code and Corporate Governance Code can enhance the effectiveness of the Non-Financial Capital and Equity Spread Synchronization Model in achieving its objectives.

The market conditions suggest that including sustainable practices that stress ESG KPIs is a major driver of growth for shareholder value [33]. In the 2023 Japanese scenario, asset owners majorly comprise life insurance companies and asset management firms have witnessed a tumultuous increase in including ESG parameters in their investment decisions and portfolio selection. The basic incorporation strategies used by institutional investors for ESG investment thesis do not vary greatly from that of other countries. Most asset managers/owners focus on companies with a strong ESG performance track record. These companies unlike others hold a greater competitive edge in the long term as they potentially could be more resilient to volatile markets and even unprecedented pandemics. Parallel to this, sustainable finance has witnessed an increase in the number of institutions that collect and analyze data on a company's ESG practices and their eligibility to secure ESG-related bonds and loans is gaining significance [34].

In a workshop organized by the CFA Institute in Japan [35], most participants pointed out that while governance issues always have an impact, the degree of impact contributed by social and environmental factors varies. A prominent reason behind this owes to the lack of metrics to calculate social and environmental factors due to the vast number of subsets under one social or environmental KPI and the subjective nature of the same [36]. Further, they highlighted that third-party research and company disclosures are updated only annually, significantly delaying the identification and rectification of ESG mismanagement risks. Although institutional investors heavily depend on the data and conclusions provided by these organizations, it is painstakingly difficult to closely observe how effective are their ESG practices and the extent of their impact beyond the indices and numbers given out by these data providers [37].

Following are a few examples that illustrate how Japanese institutional investors incorporated ESG factors into their investment processes: one of the giant institutional investors, the Government Pension Investment Fund (GPIF), has adopted ESG policy and active engagement with their portfolio companies into their investment thesis. To meet a certain target, GPIF uses exclusionary screening as their criteria to avoid investing in weapon production or environmental destruction companies [38]. As a universal owner, GPIF encourages reducing negative externalities and thereby increasing their investee company impacts. According to, "Women in the Workplace" data published by GPIF with an average disclosure rate of 50 percentage recorded a low level of participation. Further, the percentage of female new hires increased from 25.0% in 2017 to 27.0% in 2022. Despite such numbers, Task Force on Climate-related Financial Disclosures on the metrics has only environmental data published and stewardship engagement on climate change has seen a growth of +14.3% and diversity at +11.8% [38]. Another example is that of Nissay Asset Management, which has a dedicated ESG research team to constantly review the performance of companies that come under their portfolio. Further, the company effectively put its voting rights to improve the investee company's ESG performance. Additionally, it offers ESG-themed investment products like "Nissay ESG Japan Equity Fund," which is invested in companies that have strong ESG performance compared to others [39, 40].

The study conducted by Diewert et al. [41] highlights the need for effective collaboration between asset managers/owners and corporations in promoting sustainable investments. It is, therefore, imperative that both market participants work together to achieve the common goal of promoting sustainable investments and enhancing long-term shareholder value.

5.2. How the Yanagi's model can improve Japan's current economic crises and boost foreign investment?

The main argument of this research is that the Yanagi's model could accelerate Japan's economic growth in a sustainable manner, resulting in a win–win situation for all stakeholders [42]. The literature on the relationship between ESG efforts and firm-level performance is well-established. A plethora of studies have demonstrated that companies that prioritize ESG initiatives, such as reducing carbon emissions, promoting diversity, and engaging with local communities, tend to exhibit improved firm value [43, 44], superior credit ratings [45], increased productivity [46, 47], increased competitiveness [48, 49], and overall stronger financial performance [50, 51]. Additionally, numerous studies have sought to explore the connection between environmental or social legislation and firm-level performance [50–55] and examine how macroeconomic factors impact a firm's ability and willingness to implement ESG-aligned internal policies.

The most important research to back up this argument comes from the paper titled "The Effect of Firm-level ESG Practices on Macroeconomic Performance" by Zhou et al. [56]. The paper primarily delves into the examination of the relationships between the implementation of ESG practices by corporations and the macroeconomic performance of their respective nations of origin, during the 2002–2017 time frame. The study also found that ESG investments have a positive impact on the macroeconomy. Specifically, the study found that an increase in the proportion of companies with high ESG ratings leads to higher economic growth, lower inflation, and a reduction in income inequality. The study argues that this is because ESG investments lead to more sustainable and socially responsible business practices, which can create positive externalities and promote economic stability. The implications of these findings are significant. For one, they suggest that ESG investments can be a valuable tool for

companies to improve their financial performance and reduce systematic risk. Additionally, they suggest that policymakers can encourage companies to invest in ESG practices as a means of promoting economic growth and social welfare. The results, obtained from the analysis of the entire sample group, indicate that a one-unit increase in the average scores of ESG practices at the country level is positively correlated with a 0.06%, 0.10%, and 0.19% increase in the logarithm of GDP per capita, respectively. To illustrate this, if the average environmental score of Indonesian firms, which stands at 43.5, were to be raised to the level of French firms, with a score of 71.8, this would result in a 15% increase in GDP per capita, from approximately USD 4,300 to USD 4900, given all other conditions remain unchanged [56].

For the 11 emerging economies that were included in the sample, a statistically significant relationship was found between all three dimensions of corporate ESG practices and economic growth per capita. However, for developed countries, the average environmental and governance performance of firms was not found to have a statistically significant effect on national economic growth per capita. On the other hand, the average social performance of firms was found to have a positive and statistically significant effect. A one-unit increase in the mean social performance score is correlated with a 0.07% increase in the logarithm of GDP per capita, suggesting that if the mean social performance of Japanese firms, which stands at 44.56, were to be raised to the level of Spanish firms, with a score of 67.38, this would result in a 18.48% increase in Japan's GDP per capita, given all other conditions remain unchanged [56].

However, it is important to note that the study has some limitations. The authors acknowledge that the study is limited to a specific time period and country, and the results may not be generalizable to other countries or time periods. Additionally, the study is based on a correlation analysis, and causation cannot be inferred from the results. Despite these limitations, the results of the study are significant as they provide empirical evidence of the positive relationship between firm-level ESG practices and macroeconomic growth. The findings suggest that policymakers should encourage firms to adopt ESG practices to promote sustainable economic growth.

Japan has been facing several economic challenges for the past few decades, including deflation, an aging population, and a shrinking workforce [57]. The COVID-19 pandemic has further exacerbated these issues, leading to a significant decrease in foreign investment in the country. However, the Yanagi's model, which emphasizes ESG practices at the firm level, can play a crucial role in addressing these challenges and attracting foreign investment to Japan. According to a study by Kusnadi and Wei [58], firms with strong ESG practices tend to perform better financially and have higher stock returns than those with weak ESG practices. This finding is supported by another study by Grewal et al. [59], which shows that firms with higher ESG scores have a lower cost of capital, indicating that investors are willing to pay a premium for firms with strong ESG practices. The Yanagi's model, which emphasizes ESG practices at the firm level, can help Japanese firms improve their financial performance, which in turn can boost foreign investment. According to a paper by Tang and Wang [60], Japanese firms that prioritize ESG practices tend to have a competitive advantage over their peers, as they are better able to manage risks and capitalize on new opportunities. Additionally, firms that prioritize ESG practices are better able to attract and retain top talent, which can further enhance their competitive advantage. In order to implement the Yanagi's model, Japanese firms will need to adopt and integrate ESG practices into their business operations. This includes implementing sustainable business practices, promoting diversity and inclusion, and ensuring good corporate governance. One way to encourage firms to adopt these practices is through government incentives and regulations. For example, the Japanese government can offer tax incentives to firms that prioritize ESG practices or introduce regulations that require firms to disclose their ESG performance to stakeholders.

Implementing the Yanagi's model will not only improve the financial performance of Japanese firms but can also help address some of the country's broader economic challenges. For example, promoting sustainable business practices can help address environmental challenges, such as reducing carbon emissions and promoting renewable energy. Additionally, promoting diversity and inclusion can help address social challenges, such as gender inequality and discrimination. This indicates that the Yanagi's model can help Japanese companies become more resilient and sustainable in the long run. By prioritizing ESG practices, companies can reduce their environmental footprint, promote social well-being, and enhance corporate governance, which can lead to increased investor confidence and better access to capital. One key aspect of the Yanagi's model is the emphasis on stakeholder engagement. The model suggests that companies should engage with stakeholders, including employees, customers, and local communities, to understand their needs and concerns. This can help companies build stronger relationships with stakeholders and improve their reputation, which can attract new customers and investors. Additionally, stakeholder engagement can help companies identify potential risks and opportunities, which can inform their business strategy and lead to more sustainable practices.

Another aspect of the Yanagi's model is the focus on long-term value creation. This means that companies should prioritize sustainable practices that create value over the long term, rather than focusing solely on short-term profits. This can help companies build resilience and adaptability, which is particularly important in uncertain economic times. The Yanagi's model also emphasizes transparency and disclosure, which can help companies build trust with investors and other stakeholders. By disclosing information about their ESG practices, companies can demonstrate their commitment to sustainability and social responsibility, which can enhance their reputation and attract new investors.

5.3. Strength analysis of Yanagi's model

While it presents an innovative approach toward incorporating ESG practices in a firm's decision-making process, there are potential limitations that need to be acknowledged. One of the main strengths of the Yanagi's model is its comprehensive approach to ESG considerations. By incorporating a wide range of factors that are often neglected by traditional models, such as employee welfare, community engagement, and environmental impact, the model presents a more holistic view of the firm's responsibilities toward its stakeholders. This is particularly relevant in the context of Japan's economic crisis, where social and environmental issues are becoming increasingly salient and pressing.

However, the Yanagi's model's success is dependent on the firm's ability to accurately measure and quantify the impact of its ESG efforts. While the model provides a structured framework for ESG considerations, it may be challenging for firms to accurately measure the impact of their actions on macroeconomic outcomes. This is particularly relevant in the case of environmental impact, where the impact of a firm's actions may be difficult to quantify and model accurately.

Moreover, the Yanagi's model's effectiveness is dependent on the level of buy-in from firms and other stakeholders. While the model may be effective in encouraging firms to prioritize ESG considerations, there is a risk that it may not be widely adopted if firms do not see the value in such efforts. This is particularly relevant in the context of foreign investment, where firms may prioritize short-term financial gains over long-term sustainability [61]. There may be several potential challenges and barriers to adopting the Yanagi's model in the Japanese context. Some of these challenges include resistance from companies that prioritize short-term profits over long-term sustainability, lack of understanding and awareness of the importance of ESG practices among stakeholders, and difficulty in measuring and reporting on non-financial performance indicators. Additionally, there may be cultural and institutional barriers to the adoption of the Yanagi's model, such as a lack of transparency and accountability in corporate governance practices and a tendency toward hierarchical decision-making structures. The government and regulatory bodies may also face challenges in implementing policies and regulations that encourage the adoption of the Yanagi's model, particularly if there is resistance from powerful business interests.

To overcome these challenges, it may be necessary to engage in stakeholder education and awareness campaigns, provide incentives for companies to prioritize ESG practices, and establish a culture of transparency and accountability in corporate governance. Additionally, the government may need to introduce granular regulatory frameworks that require companies to report on their non-financial performance and establish partnerships with civil society organizations and other stakeholders to promote ESG practices and the adoption of the Yanagi's model.

In conclusion, while the Yanagi's model presents a promising approach toward incorporating ESG considerations in firm decision-making, its effectiveness is dependent on various factors. While it has the potential to address Japan's current economic crisis and boost foreign investment, it is essential to acknowledge its potential limitations and address these challenges proactively. This will require a collaborative effort from firms, policymakers, and other stakeholders to ensure that ESG considerations are effectively integrated into corporate decision-making processes.

6. Recommendations

This paper envisages a few suggestions that could be made to improve the present Yanagi's model and to further boost the Japanese economy. First, one recommendation is to encourage more companies to adopt the model by providing incentives for doing so. The current model has only been adopted by only a limited number of companies. Despite promising results, the model needs to be tested among a variety of establishments across multiple sectors.

Based on the analysis, it is recommended that future research on the Yanagi's model should consider implementing standardized reporting requirements or third-party verification processes to improve the reliability and transparency of non-financial capital performance reporting. This could be achieved through the development of integrated reporting frameworks that provide a comprehensive overview of a company's sustainability performance, including its ESG and SDG indicators. Furthermore, it is important to note that disclosure on its own may not necessarily drive financial performance, as studies have shown that performance-based ESG measures are more effective in this regard. Therefore, it is recommended that the Yanagi's model prioritizes using performance-based ESG measures to drive financial outcomes and promote sustainable economic growth [62]. Further, Yanagi for his research has only catered to consolidated KPIs, leaving behind several proxy KPIs that might impact the businesses. This paper recommends that future model updates should consider the proxy KPIs alongside consolidated ones.

Additionally, there could be further research and development to refine the model and its impact on corporate performance. For example, research could be conducted to better understand the relationship between the different types of non-financial capital, such as social and environmental capital, and how they impact a company's financial performance. This could help to refine the model and ensure that it accurately captures the full range of non-financial capital that can contribute to corporate success.

In addition, Japan's economy heavily relies on small and medium-sized enterprises (SMEs), which comprise over 99% of all companies in the country [63]. These companies face unique challenges in adopting ESG practices, such as a lack of resources, expertise, and market pressure. Therefore, any proposal to promote ESG practices in Japan must consider the needs and constraints of these SMEs [57, 64].

Lastly, emphasis is on the importance of actively engaging with companies to increase their ESG and SDG indicators. This engagement should focus on developing a clear conceptual framework for understanding the linkages between ESG and SDG factors, conducting empirical research to demonstrate the impact of sustainability initiatives, disclosing sustainability performance through integrated reporting, and building long-term relationships with key stakeholders. Additionally, companies need to set clear sustainability goals and performance targets, measure and report on their progress, and continuously improve their sustainability performance over time. Finally, it is recommended to emphasize the importance of tracking and recording engagement to demonstrate stewardship credentials and foster transparency and accountability.

7. Conclusion

In retrospect, the Yanagi's model presents a viable path toward building an ESG-friendly economy for Japan. The model's focus on incorporating non-financial capital and sustainability factors into equity valuation aligns with the global trend toward ESG investing. Japan has recognized the importance of ESG investing and has made significant strides toward integrating it into the corporate and investment landscape. However, there is still room for improvement in terms of the widespread adoption and implementation of ESG practices. Adopting the Yanagi's model can provide a framework for Japanese companies to integrate ESG factors into their decision-making processes and investments. As Japan moves toward a more sustainable and responsible business environment, it can position itself as a leader in the global ESG movement. The empirical evidence presented by Yanagi and Yoshino supports the efficacy of the Yanagi's model and provides a basis for its implementation in Japanese companies. Ultimately, the success of the Yanagi's model and Japan's ESG adoption depends on the commitment and collaboration of various stakeholders, including asset managers, corporations, policymakers, and investors. However, with its potential to drive economic growth and promote sustainability, the Yanagi's model offers a promising avenue for Japan to build a more ESG-friendly economy. As stated by Yanagi [14], "Businesses should be a force for good in society." The Yanagi's model provides a framework for businesses to do just that, by incorporating ESG initiatives into their business practices and ultimately contributing to a more sustainable and equitable future for all.

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Ethical Statement

This study does not contain any studies with human or animal subjects performed by any of the authors.

Conflicts of Interest

The authors declare that they have no conflicts of interest to this work.

Data Availability Statement

Data are available on request from the corresponding author upon reasonable request.

Author Contribution Statement

Asheer Rahman: Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – Original draft, Writing – review & editing, Visualization, Supervision, Project administration. **Varsha Varghese:** Conceptualization, Methodology, Software, Validation, Formal analysis, Investigation, Resources, Data curation, Writing – Original draft, Writing – review & editing, Visualization, Supervision, Project administration.

References

[1] Takehara, M., & Hasegawa, N. (2020). *Sustainable management of Japanese entrepreneurs in pre-war period from the perspective of SDGs and ESG*. UK: Palgrave Macmillan. https://doi.org/10.1007/978-981-15-6507-6

[2] United Nations. (2015). *Transforming our world: The 2030 agenda for sustainable development* (A/RES/70/1). https://docs.un.org/en/A/RES/70/1

[3] Darnall, N., Ji, H., Iwata, K., & Arimura, T. H. (2022). Do ESG reporting guidelines and verifications enhance firms' information disclosure? *Corporate Social Responsibility and Environmental Management*, *29*(5), 1214–1230. https://doi.org/10.1002/csr.2265

[4] Oshiro, K., Kainuma, M., & Masui, T. (2016). Assessing decarbonization pathways and their implications for energy security policies in Japan. *Climate Policy*, *16*, S63–S77. https://doi.org/10.1080/14693062.2016.1155042

[5] Aoyagi, C., & Ganelli, G. (2017). Unstash the cash! Corporate governance reform in Japan. *Journal of Banking and Financial Economics*, *1*(7), 51–69. https://doi.org/10.7172/2353-6845.jbfe.2017.1.3

[6] Tanaka, K. (2010). Perceived development and unperceived decline of corporate governance in Japan. *Hitotsubashi Journal of Commerce and Management, 44*(1), 13–28.

[7] Kato, K., Li, M., & Skinner, D. J. (2017). Is Japan really a "buy"? The corporate governance, cash holdings and economic performance of Japanese companies. *Journal of Business Finance & Accounting*, *44*(3–4), 480–523. https://doi.org/10.1111/jbfa.12235

[8] Schumacher, P. (2020). *The incorporation of ESG scores into factor based investment decisions. Does ESG integration necessarily come with a financial trade-off?* Master's Thesis, Lund University.

[9] Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., …, & Moher, D. (2021). The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. *BMJ*, *372*, n71. https://doi.org/10.1136/bmj.n71

[10] Yanagi, R., & Michels-Kim, N. (2021). EISAI's ESG investments. *Strategic Finance*, *102*(11), 46–53.

[11] Yanagi, R. (2018). Cash valuation assessment of Japanese corporations: When 100 yen is valued at 50 yen. In R. Yanagi (Ed.), *Corporate governance and value creation in Japan: Prescriptions for boosting ROE* (pp. 13–48). Springer Nature Singapore. https://doi.org/10.1007/978-981-10-8503-1_2

[12] Yanagi, R. (2015). Corporate governance code and 'Engagement with shareholders'—Implications of global investor survey and study for equity spread. *SAAJ Journal*, *9*.

[13] Corporate Finance Institute. (2023). *Market to book ratio*. Retrieved from: https://corporatefinanceinstitute.com/resources/valuation/market-to-book-ratio-price-book/

[14] Yanagi, R. (2018). Synchronization of non-financial capital and value creation: Japan should show ROE of ESG. In R. Yanagi (Ed.), *Corporate governance and value creation in Japan: Prescriptions for boosting ROE* (pp. 167–210). Springer. https://doi.org/10.1007/978-981-10-8503-1_7

[15] Ito, T. (2021). An assessment of abenomics: Evolution and achievements. *Asian Economic Policy Review*, *16*(2), 190–219. https://doi.org/10.1111/aepr.12353

[16] Opler, T., Pinkowitz, L., Stulz, R., & Williamson, R. (1999). The determinants and implications of corporate cash holdings. *Journal of Financial Economics*, *52*(1), 3–46. https://doi.org/10.1016/s0304-405x(99)00003-3

[17] Roe, M. J. (1993). Some differences in corporate structure in Germany, Japan, and the United States. *The Yale Law Journal*, *102*(8), 1927–2003. https://doi.org/10.2307/796856

[18] Yanagi, R. (2018). *Corporate governance and value creation in Japan: Prescriptions for boosting ROE*. Singapore: Springer Nature Singapore. https://doi.org/10.1007/978-981-10-8503-1

[19] Faulkender, M., & Wang, R. (2006). Corporate financial policy and the value of cash. *The Journal of Finance*, *61*(4), 1957–1990. https://doi.org/10.1111/j.1540-6261.2006.00894.x

[20] Dittmar, A., & Mahrt-Smith, J. (2007). Corporate governance and the value of cash holdings. *Journal of Financial Economics*, *83*(3), 599–634. https://doi.org/10.1016/j.jfineco.2005.12.006

[21] Gilson, R. J., & Roe, M. J. (1993). Understanding the Japanese Keiretsu: Overlaps between corporate governance and

industrial organization. *The Yale Law Journal*, *102*(4), 871–906. https://doi.org/10.2307/796835

[22] Lincoln, J. R., Gerlach, M. L., & Ahmadjian, C. L. (1996). Keiretsu networks and corporate performance in Japan. *American Sociological Review*, *61*(1), 67–88. https://doi.org/10.2307/2096407

[23] Hossain, A., Bose, S., & Shamsuddin, A. (2023). Diffusion of integrated reporting, insights and potential avenues for future research. *Accounting & Finance*, *63*(2), 2503–2555. https://doi.org/10.1111/acfi.12981

[24] Aldowaish, A., Kokuryo, J., Almazyad, O., & Goi, H. C. (2022). Environmental, social, and governance integration into the business model: Literature review and research agenda. *Sustainability*, *14*(5), 2959. https://doi.org/10.3390/su14052959

[25] Yoshikawa, T., & Chua, G. (2020). COVID-19 and Japanese shareholder activism: Brief respite for Japan's self-healing concrete. *Asian Business & Management*, *19*(3), 302–305. https://doi.org/10.1057/s41291-020-00122-2

[26] Miyajima, H., & Saito, T. (2021). Corporate governance reforms under Abenomics: The economic consequences of two codes. In T. Hoshi & P. Y. Lipscy (Eds.), *The political economy of the Abe Government and Abenomics reforms* (pp. 357–393). Cambridge University Press. https://doi.org/10.1017/9781108921145.012

[27] Haut, S. (2022). *The case for impact: A guide to creating value in a world of social and environmental challenges*. Switzerland: Self Publishing.

[28] Yao, J., & Johanson, U. (2022). A review of government-led health and productivity management and disclosure practice in Japan. *Frontiers in Sustainability*, *3*, 939316. https://doi.org/10.3389/frsus.2022.939316

[29] Yanagi, R., & Yoshino, T. (2017) Jinteki shihon chiteki shihon to kigyō kachi (PBR) no kankei-sei no kōsatsu [Relation between human/intellectual capitals and corporate value (PBR)]. *Gekkan Shihon Shijō*, (386), 4–13.

[30] Yanagi, R., & Michels-Kim, N. (2018). Integrating nonfinancials to create value. *Strategic Finance*, *99*(7), 26–36.

[31] Vogel, D. (2006). *The market for virtue: The potential and limits of corporate social responsibility*. USA: Brookings Institution Press.

[32] Sekiyama, T. (2022). Climate security and its implications for East Asia. *Climate*, *10*(7), 104. https://doi.org/10.3390/cli10070104

[33] Dowell, G., Hart, S., & Yeung, B. (2000). Do corporate global environmental standards create or destroy market value? *Management Science*, *46*(8), 1059–1074. https://doi.org/10.1287/mnsc.46.8.1059.12030

[34] Karim, S., & Ilyas, M. (2021). Foreign institutional investors and the contribution of cash and dividend to firm's value. *Managerial Finance*, *47*(3), 310–325. https://doi.org/10.1108/MF-11-2019-0568

[35] Tan, Y. M., Szulczyk, K., & Sii, Y. H. (2023). Performance of ESG-integrated smart beta strategies in Asia-Pacific stock markets. *Research in International Business and Finance*, *66*, 102008. https://doi.org/10.1016/j.ribaf.2023.102008

[36] Schumacher, K., Chenet, H., & Volz, U. (2020). Sustainable finance in Japan. *Journal of Sustainable Finance & Investment*, *10*(2), 213–246. https://doi.org/10.1080/20430795.2020.1735219

[37] Richard, Halim, E., Irwanto, F., Peko, G., & Sundaram, D. (2023). Advancing the environmental, social, and governance (ESG) with blockchain: A PRISMA review. In *Blockchain and Applications, 5th International Congress*, 103–112. https://doi.org/10.1007/978-3-031-45155-3_11

[38] Government Pension Investment Fund. (2022). *2021 ESG REPORT government pension investment fund*. Retrieved from: https://www.gpif.go.jp/en/investment/esg/

[39] Goto, G. (2022). The Japanese Stewardship Code: Its resemblance and non-resemblance to the UK code. In D. Katelouzou & D. W. Puchniak (Eds.), *Global shareholder stewardship* (pp. 222–238). Cambridge University Press. https://doi.org/10.1017/9781108914819.011

[40] Brav, A., Cain, M., & Zytnick, J. (2022). Retail shareholder participation in the proxy process: Monitoring, engagement, and voting. *Journal of Financial Economics*, *144*(2), 492–522. https://doi.org/10.1016/j.jfineco.2021.07.013

[41] Diewert, W. E., Nishimura, K. G., Shimizu, C., & Watanabe, T. (2020). *Property price index: Theory and practice*. Japan: Springer Japan. https://doi.org/10.1007/978-4-431-55942-9

[42] Wang, J., Yu, J., & Zhong, R. (2023). Country environmental, social and governance performance and economic growth: The international evidence. *Accounting & Finance, 63*(4), 3911–3941. https://doi.org/10.1111/acfi.13079

[43] Kobayashi, M., & Horimoto, M. (2021). Corporate sector: Women leaders in Japanese companies. In Y. T. Nakamura, M. Horimoto, & G. N. McLean (Eds.), *Japanese women in leadership* (pp. 109–123). Palgrave Macmillan. https://doi.org/10.1007/978-3-030-36304-8_6

[44] Yu, E. P. Y., Luu, B. V., & Chen, C. H. (2020). Greenwashing in environmental, social and governance disclosures. *Research in International Business and Finance*, *52*, 101192. https://doi.org/10.1016/j.ribaf.2020.101192

[45] Devalle, A., Fiandrino, S., & Cantino, V. (2017). The linkage between ESG performance and credit ratings: A firm-level perspective analysis. *International Journal of Business and Management*, *12*(9), 53–65. https://doi.org/10.5539/ijbm.v12n9p53

[46] Albrizio, S., Kozluk, T., & Zipperer, V. (2017). Environmental policies and productivity growth: Evidence across industries and firms. *Journal of Environmental Economics and Management*, *81*, 209–226. https://doi.org/10.1016/j.jeem.2016.06.002

[47] Koźluk, T., & Zipperer, V. (2015). Environmental policies and productivity growth – A critical review of empirical findings. *OECD Journal: Economic Studies*, *2014*(1), 155–185. https://doi.org/10.1787/eco_studies-v2014-1-en

[48] Dechezleprêtre, A., & Sato, M. (2017). The impacts of environmental regulations on competitiveness. *Review of Environmental Economics and Policy*, *11*(2), 183–206. https://doi.org/10.1093/reep/rex013

[49] Madsen, H., & Ulhøi, J. P. (2001). Integrating environmental and stakeholder management. *Business Strategy and the Environment*, *10*(2), 77–88. https://doi.org/10.1002/bse.279

[50] Friede, G., Busch, T., & Bassen, A. (2015). ESG and financial performance: Aggregated evidence from more than 2000 empirical studies. *Journal of Sustainable Finance & Investment*, *5*(4), 210–233. https://doi.org/10.1080/20430795.2015.1118917

[51] Yoon, B., Lee, J. H., & Byun, R. (2018). Does ESG performance enhance firm value? Evidence from Korea. *Sustainability*, *10*(10), 3635. https://doi.org/10.3390/su10103635

[52] Clark, G. L. (2014). Information, knowledge, and investing in offshore financial markets. *Journal of Sustainable Finance & Investment*, *4*(4), 299–320. https://doi.org/10.1080/20430795.2014.980656

[53] Cohen, M. A., & Tubb, A. (2018). The impact of environmental regulation on firm and country competitiveness: A meta-analysis of the Porter hypothesis. *Journal of the Association of Environmental and Resource Economists*, *5*(2), 371–399. https://doi.org/10.1086/695613

[54] López-Arceiz, F. J., Bellostas-Pérezgrueso, A. J., & Moneva, J. M. (2018). Evaluation of the cultural environment's impact on the performance of the socially responsible investment funds. *Journal of Business Ethics*, *150*(1), 259–278. https://doi.org/10.1007/s10551-016-3189-4

[55] Rubashkina, Y., Galeotti, M., & Verdolini, E. (2015). Environmental regulation and competitiveness: Empirical evidence on the Porter Hypothesis from European manufacturing sectors. *Energy Policy*, *83*, 288–300. https://doi.org/10.1016/j.enpol.2015.02.014

[56] Zhou, X., Caldecott, B., Harnett, E., & Schumacher, K. (2020). *The effect of firm-level ESG practices on macroeconomic performance* (Working Paper No. 20-03). http://dx.doi.org/10.2139/ssrn.3618748

[57] Lincoln, E. J. (2011). Japan's long-term economic challenges. *Comparative Economic Studies*, *53*(3), 455–474. https://doi.org/10.1057/ces.2011.13

[58] Kusnadi, Y., & Wei, K. C. J. (2011). The determinants of corporate cash management policies: Evidence from around the world. *Journal of Corporate Finance*, *17*(3), 725–740. https://doi.org/10.1016/j.jcorpfin.2010.12.002

[59] Grewal, J., Hauptmann, C., & Serafeim, G. (2021). Material sustainability information and stock price informativeness. *Journal of Business Ethics*, *171*(3), 513–544. https://doi.org/10.1007/s10551-020-04451-2

[60] Tang, T., & Wang, Y. (2021). Liquidity shocks, price volatilities, and risk-managed strategy: Evidence from Bitcoin and beyond. *Journal of Multinational Financial Management*, *64*, 100729. https://doi.org/10.1016/j.mulfin.2022.100729

[61] Pérez, L., Hunt, V., Samandari, H., Nuttall, R., & Biniek, K. (2022). Does ESG really matter and why? *McKinsey Quarterly*, *60*(1), 1–9.

[62] Cardillo, M. A. R., & Basso, L. F. C. (2024). Revisiting knowledge on ESG/CSR and financial performance: A bibliometric and systematic review of moderating variables. *Journal of Innovation & Knowledge*, *10*(1), 100648. https://doi.org/10.1016/j.jik.2024.100648

[63] Allain-Dupré, D. (2020). The multi-level governance imperative. *The British Journal of Politics and International Relations, 22*(4), 800–808. https://doi.org/10.1177/1369148120937984

[64] de Zoysa, A., & Takaoka, N. (2020). Corporate social responsibility performance of small and medium enterprises in regional Japan: An empirical examination. *Social Responsibility Journal*, *16*(4), 449–466. https://doi.org/10.1108/SRJ-05-2018-0116

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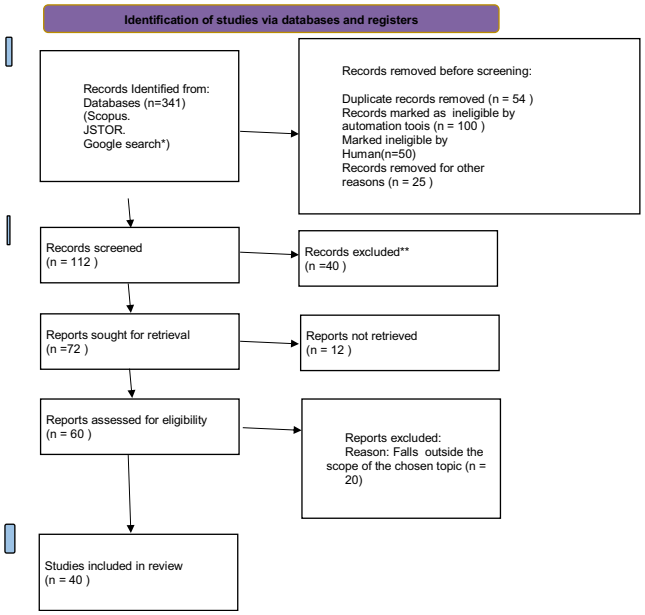
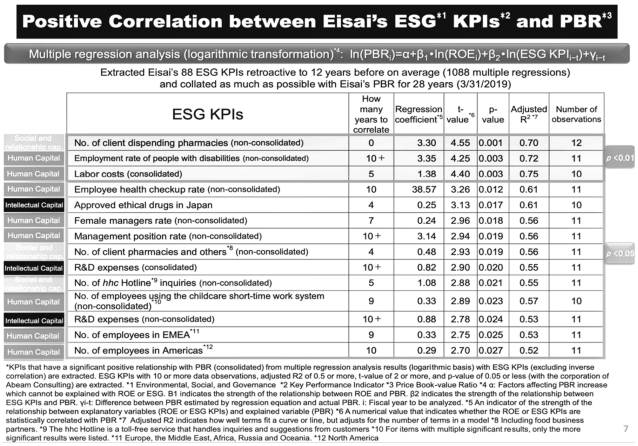
Appendix

Figure A1
PRISMA flow diagram



Note: *Google search was used as there have not been considerable previous reports on Yanagi's model; therefore, it was necessary to understand alternate views on FT report, financial reports of companies.

Figure A2
Results of multiple regression analysis



Positive Correlation between Eisai's ESG*1 KPIs*2 and PBR*3

Multiple regression analysis (logarithmic transformation)*4: $\ln(PBR_t)=\alpha+\beta_1 \cdot \ln(ROE_t)+\beta_2 \cdot \ln(ESG\ KPI_{t-i})+\gamma_{t-1}$

Extracted Eisai's 88 ESG KPIs retroactive to 12 years before on average (1088 multiple regressions) and collated as much as possible with Eisai's PBR for 28 years (3/31/2019)

	ESG KPIs	How many years to correlate	Regression coefficient*5	t-value*6	p-value	Adjusted R^{2}*7	Number of observations	
Social and relationship cap.	No. of client dispending pharmacies (non-consolidated)	0	3.30	4.55	0.001	0.70	12	
Human Capital	Employment rate of people with disabilities (non-consolidated)	10 +	3.35	4.25	0.003	0.72	11	p <0.01
Human Capital	Labor costs (consolidated)	5	1.38	4.40	0.003	0.75	10	
Human Capital	Employee health checkup rate (non-consolidated)	10	38.57	3.26	0.012	0.61	11	
Intellectual Capital	Approved ethical drugs in Japan	4	0.25	3.13	0.017	0.61	10	
Human Capital	Female managers rate (non-consolidated)	7	0.24	2.96	0.018	0.56	11	
Human Capital	Management position rate (non-consolidated)	10 +	3.14	2.94	0.019	0.56	11	
Social and relationship cap.	No. of client pharmacies and others*9 (non-consolidated)	4	0.48	2.93	0.019	0.56	11	p <0.05
Intellectual Capital	R&D expenses (consolidated)	10 +	0.82	2.90	0.020	0.55	11	
Social and relationship cap.	No. of *hhc* Hotline*9 inquiries (non-consolidated)	5	1.08	2.88	0.021	0.55	11	
Human Capital	No. of employees using the childcare short-time work system (non-consolidated)*10	9	0.33	2.89	0.023	0.57	10	
Intellectual Capital	R&D expenses (non-consolidated)	10 +	0.88	2.78	0.024	0.53	11	
Human Capital	No. of employees in EMEA*11	9	0.33	2.75	0.025	0.53	11	
Human Capital	No. of employees in Americas*12	10	0.29	2.70	0.027	0.52	11	

*KPIs that have a significant positive relationship with PBR (consolidated) from multiple regression analysis results (logarithmic basis) with ESG KPIs (excluding inverse correlation) are extracted. ESG KPIs with 10 or more data observations, adjusted R2 of 0.5 or more, t-value of 2 or more, and p-value of 0.05 or less (with the corporation of Abeam Consulting) are extracted. *1 Environmental, Social, and Governance *2 Key Performance Indicator *3 Price Book-value Ratio *4 α: Factors affecting PBR increase which cannot be explained with ROE or ESG. B1 indicates the strength of the relationship between ROE and PBR. β2 indicates the strength of the relationship between ESG KPIs and PBR. γi-t: Difference between PBR estimated by regression equation and actual PBR. i: Fiscal year to be analyzed. *5 An indicator of the strength of the relationship between explanatory variables (ROE or ESG KPIs) and explained variable (PBR) *6 A numerical value that indicates whether the ROE or ESG KPIs are statistically correlated with PBR *7 Adjusted R2 indicates how well terms fit a curve or line, but adjusts for the number of terms in a model *8 Including food business partners. *9 The hhc Hotline is a toll-free service that handles inquiries and suggestions from customers *10 For items with multiple significant results, only the more significant results were listed. *11 Europe, the Middle East, Africa, Russia and Oceania. *12 North America

7

Figure A3
Yanagi's model with Topix 100 and Topix 500 companies