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The Potential Effects of ESG Materiality and Compatibility on Post-M&A Performance

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Abstract

The Potential Effects of ESG Materiality and Compatibility on Post-M&A Performance

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Prior studies have examined the roles of ESG and how it would affect a firm from a variety of aspects including firm performance, status, and shareholder value. In this research, I aim to consider whether a firm would benefit from acquiring a target with not only a high ESG rating on the 3 major categories (i.e., E, S, G), but also impactful scores in the 'material' sectors subjected to the acquirer's industry. To explore the theoretical perspectives, I examined 111 dyads formed under the structure of M&A and computed the ESG materiality score for the target firm based on the acquirer's industry-specific characteristics. The empirical findings suggest that the target firm's ESG materiality would positively enhance the acquirer's financial outcomes in the long term. The compatibility between the two firms' ESG pre-deal gap, especially in the social sector, provides a rather different finding from the existing research and highlights the importance of organizational fit achieved in terms of sustainability orientation. This study contributes to the recent discussions on ESG materiality as well as the desired dyadic structure (i.e., priority over compatibility or complementarity) between acquirer and target.

Keywords : ESG Materiality; Compatibility; Sustainability Gap; Conformity in Dyad; Post-M&A Performance

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"It's time to really talk about ESG materiality."
--- Sarah E. Fortt

1. INTRODUCTION

Extant literature has examined the potential roles of ESG on firm performance and how it may be used as a selection criterion for not only stakeholders and investors, but also for the firm itself in terms of partner selection process. While the existing research has largely focused on the overall ESG ratings underneath the broader categories (i.e., environmental, social, governance), there has been an increasing awareness on the different sectors within ESG that would be applied differently depending on the specific firm and industry. In other words, ESG materiality, which is defined as the effectiveness and financial significance of certain specific measures within a firm's overall ESG analysis, should be more closely examined from the industry-level and firm-level. Firms that focus on industry-specific materiality issues have been shown to perform better (Eccles & Serafeim, 2013), and the potential impact on the overall firm performance also varies depending on how relevant an issue is toward the firm's core business value.

Meanwhile, ESG considerations have become increasingly important in the decision-making process for mergers and acquisition. Especially when it comes to post-acquisition performance, ESG may play an accelerating role besides the traditional financial elements. More specifically, the integration of ESG factors into the structure of an M&A deal may benefit the acquirer more than the target. For example, a few research has disclosed that by targeting sustainably responsible firms, a bidder would be benefitted from the reduced risk and enhanced reputation. Tampakoudis & Anagnostopoulou (2020)

has further examined M&A deals in the European settings and concluded that a target firm with relatively better ESG performance would not only directly influence the acquirers' sustainable orientation but also its market value. Deng et al. (2013) has also announced a finding that M&A deals constructed based on the ESG criteria would be more likely to succeed and may result in a better operating performance of the acquirer. Overall, it seems fairly reasonable to say that the ESG performance of the target firm is important in the M&A transaction as it may bring certain influence to the acquirer's overall performance.

Despite the consensus driven among the previous studies, there remains a research gap in terms of the specific role of firm-specific ESG materiality within the context of the dyad as well as the internal conformity between the ESG performance of the two firms when forming an M&A relationship. The majority of research related to ESG and M&As would solely incorporate the combined ESG ratings (i.e., inclusion of both material and immaterial sectors) as well as the individual scores for the three common pillars, with few studies emphasizing on the ESG materiality. Materiality, which refers to the measure of relative financial importance of a factor among a firm's ESG considerations, may impose more direct influence on a firm's operation and performance. Heijiningen (2019) has specifically argued that when compared with the total ESG or immateriality scores, materiality issues are more accurate in terms of predicting the financial performance of the research subject. Khan et al. (2016) also shows that a high performance on immaterial ESG issues do not lead to superior financial performance. Based on the above factors, I aim to use ESG materiality as a determining factor and examine how the target firm's ESG materiality would enhance an acquirer's post-M&A performance. Moreover, a few of the studies have examined the discrepancy between acquirer and target

in terms of sustainability. For example, Cardillo & Harasheh (2020) has presented a finding that the divergence in the sustainable performance between acquiror and target in an M&A would yield negative effects including increased deal timing and reduced speed closure (i.e., requiring more days until the close of the M&A transaction). On the contrary, the existing gap between the firms involved in acquisition may provide more learning opportunities for the acquirer. The degree to which the discrepancy, or the compatibility between acquirer and target in an M&A deal thus should be viewed more cautiously as it may potentially affect the efficiency of a merged deal.

The objective of this research is to investigate the impact of target firm's ESG performance on the acquirer's post-M&A performance. Instead of using the generalized ESG scores, I aim to calculate the target's materiality score based on the acquirer's industry to illustrate whether acquirers would truly absorb and be benefited from the target's sustainable behaviors through acquisition. A competing hypothesis will be used to examine the effect of the ESG gap between acquirer and target due to the rather contradicting approach toward compatibility and complementarity in the established theories. Moreover, acquirer's previous acquisition experience will be used as a potential element to moderate for the main effect between target's ESG materiality and post-deal performance. Studies such as Conn et al. (2005) have demonstrated that firms with more acquisition experience will be a more efficient 'leaner' and able to utilize the resource obtained from the past established relationships.

In order to calculate the materiality score for both acquirer and target, I would like to replicate the method introduced in Havlinova & Kukacka (2021), as it has specifically outlined the material issues relevant to each industry. The research sample will

be consisted of U.S. domestic M&As taken place between 2009 and 2019 due to the data availability and the incorporation of lagged variable. The score on each material issue will be obtained from Refinitiv Eikon, which is a widely used database that covers ratings for the specific issues under each common category. To capture the effect of acquisition, the materiality score will be calculated with data one year prior to the deal announcement date, and the post-M&A performance will be measured with two different performance indicators: return on asset (ROA) and return on equity (ROE).

The potential contribution of this research would be as follows. First, by focusing primarily on the material issues, I aim to contribute to the ESG literature from a narrower perspective as the combined scores used in the prior research may be unable to accurately capture how relevant or significant a target firm's ESG may be for the acquirer. Moreover, by focusing on the dyadic relationship through the context of M&A, the research would be able to examine whether a target's ESG performance would affect an acquirer in the long-term, suggesting for the possibility that ESG materiality may become a potential criterion to be considered by acquirer when seeking for a potential target. Overall, although the previous literatures have highlighted the positive roles of ESG, the acquirer should carefully consider the ESG performance from a variety of aspects including the degree of materiality, compatibility as well as the acquirer's own performance level before the M&A takes place.

2. THEORY AND HYPOTHESES

2.1. ESG Materiality & Firm Performance

It has been widely recognized in various research that an enhancement in ESG may

affect a firm's key value drivers including profitability, growth, and capital efficiency (Schramade, 2016). The significance of ESG has been approached from two opposing perspectives in the past literature: stakeholder theory and agency theory. While the earlier research on corporate finance has largely considered shareholder value maximation as the primary firm objective, stakeholder theory (Freeman, 1984) draws attention toward the stakeholder's interest and emphasizes on the importance for the firm to fulfill the stakeholder's expectations through the practice of sustainability management. Meanwhile, the agency theory perceives CSR as a factor that may potentially result in negative capital allocation efficiency due to the conflicts between managers and shareholders (Bhandari & Javakhadze, 2017), which urges firms to refocus on their profit-oriented goals. The empirical studies have also demonstrated a mixed result in terms of the impact of ESG strategies on the firm performance. In fact, Nirino et al. (2021) has argued that the relationship between ESG and financial performance is more complex than a simple cause-effect relationship, and various factors should be considered in order to understand the impact of one on the other. Although some scholars (e.g., Kim & Lyon, 2015) have perceived ESG as an additional cost that may in return decrease the firm's financial outcome, others have underlined the positive impacts of ESG considerations such as the reduced tax and operational risks, improved ability to retain consumers and to enhance the overall brand reputation (Malik, 2015). Since a firm's reputation can be used to enhance its own financial performance (Aguilera et al., 2007), ESG has somehow ben considered as a critical element that could affect a firm's overall performance.

In terms of the reasons that may have caused for such inconsistent findings, Kim & Lee (2020) has suggested that the inconclusive results on the relationship between ESG

and firm performance may have been caused by the incorporation of both material and immaterial CSR/sustainability dimensions in the empirical designs. As most existing research would only utilize the combined ESG score or ratings for the broader categories (i.e., E, S, G), the result may have not been able to fully capture the impact of ESG from a firm-specific view. In line with the resource-based view, a firm that concentrates its resources mostly on material issues (i.e., issues that are perceived to be more important to TMT, asset managers, and other stakeholders) would be perceived as more efficient than firms that invest in immaterial topics (Kim & Lee, 2020). As the influence of ESG on firm performance may be largely dependent on the industry characteristics and norms (Lee et al., 2013), it seems to be important to consider ESG from a narrower perspective.

In order to determine the material issues for each firm, several scholars have carefully examined the industry differences as industry has been considered as the primary factor constructing for materiality. For example, Bender et al. (2018) has discovered that the relative importance of environmental, social and governance vary by sector and would affect a firm to a varying degree. While real estate sector would mostly likely to concentrate on improving the environmental sector, industries such as materials and consumer discretionary would allocate equal weight to each of the factor related to ESG due to the industry specificities (Bender et al., 2018). Havlinova & Kukacka (2021) has also differentiated between strategic (i.e., material) and secondary activities for each industry. Firms investing in secondary activities may be regarded as not taking the most efficient strategies by the market since investment on less important issues may not contribute to the firm's financial outcome directly (Kim & Lee, 2020). Thus, the authors have predicted that investment in material aspects would be more likely to yield positive

impact on a firm's financial performance in the long-term.

2.2. ESG in the context of M&A

Although extant literature has largely investigated ESG and M&A on a stand-alone basis, there has been a lack of focus on the relationship between the two areas of study. As ESG has gradually gained more attention in terms of its potential impact on firm performance and value, scholars have slowly begun to incorporate ESG-related factors into the study on acquisitions. For example, Gomes (2019) has specifically examined the CSR activities of the target firms in the existing M&A deals. According to the research finding, target firms tend to have higher average CSR scores than non-target firms, which indicates that a firm's sustainable performance could be positively associated with its propensity to become a valuable M&A target. A few other research have also examined how a target firm's CSR would affect an M&A from a variety of aspects. For example, a target firm's sustainability may not only be positively related to M&A bid premium (Gomes & Marsat, 2018), but also be able to increase the overall announcement returns and lead to more wealth creation (Aktas et al., 2011). This is partially in line with the resource-based view proposed by Barney (1991), in which a firm's sustainable investment can be considered as a source of intangible asset and impact firms' characteristics. Activities that are not directly tied to a firm's financial outcome may develop into intangible assets and contribute to the know-how, corporate culture and overall reputation including loyalty from the customers and employees (Aragon-Correa & Sharma, 2003). Corporate sustainability may also directly benefit an acquiror in an M&A transaction. According to Bettinazzi & Zollo (2017), a stakeholder-oriented behavior may largely affect the M&A process as well as the

acquiror's performance. The positive relation has also been demonstrated in Lin & Wei (2006) as the authors examined the acquirors' post-acquisition performance by focusing on the targets' sustainable efforts such as justice and employee security. The ESG considerations within an M&A deal thus may lead to an increase of value for the acquiror.

Among the few studies which have drawn correlation between ESG and M&A, the majority has focused on the common categories without the consideration for firm-specific aspect or the overall materiality. One of the recent studies, however, has focused on the environmental sector and provided an interesting result that acquirers opting for 'green' deals tend to experience better financial outcomes compared to firms that acquire targets in other sectors (Salvi et al., 2018). Atkas et al. (2011) has also demonstrated that by acquiring a firm with relatively better environmental profile, the acquirer would be able to gain additional knowledge to improve its own environmental sector as a form of sustainability. However, one of the limitations in the previous research is that most of the scholars have primarily concentrated on the 'environmental' sector, partially because environment has been considered as the most urgent issue needed to solved. Yet in reality, ESG has penetrated into diverse aspects and should be evaluated based on more objective, and most of all, 'relevant' standard. Thus, although studies such as Salvi et al. (2018) has indicated that acquirer would witness a positive performance change after acquiring a high-ESG target, there is a need to specifically pin down the acquirer's material issues and examine the target's sustainable performance based on such factors. Thus, hypothesis 1 below aims to narrowly focus on the target's ESG materiality based on the characteristics of the acquirer.

Hypothesis 1: Firms that acquire targets with higher acquiror-specific ESG material score will be more likely to have higher post-M&A performance.

2.3. ESG Compatibility vs. Complementarity

Scholars in the field of strategic management have closely examined the various factors that could influence the formation and outcome of M&As, including the pre-merger relatedness, perceived similarity and complementarity on firm performance (Cartwright, 2006). Moreover, whether the acquiror and target firm can successfully integrate with each other remains as one of the primary agendas as numerous research has disclosed that an efficient integration process is essential for the post-merger performance and the general success of the deal (e.g., Birkinshaw et al., 2000). The strategic fit, therefore, may impose significant impact on the potential outcome of such dyadic relationship. Among the various factors related to the overall 'fit' between acquiror and target, compatibility and complementarity have been considered as a rather opposing concept. While compatibility may usually contribute to the 'match quality' in a dyadic relationship through similarities, complementarity may be manifested through differences such that the capabilities of two firms would be considered as complementary if they are different in a way that can be combined to create greater value (Mitsuhashi & Greve, 2009). The following theories will be used to discuss on each of the aforementioned aspect respectively.

When choosing for a potential partner (e.g., an acquirer seeking for a potential target firm), compatibility may become a determining factor as the focal firm shares certain traits with the partner firm. Congruence theory has been applied to inter-organizational relationships and aims to examine the degree of similarities in the behaviors of partnering

firms and organizations (Hinde, 1979). Within the congruence theory, compatibility, being defined as the similarity of goals, business philosophy and firm culture (Bucklin & Sengupta, 1993), has been said to affect the potential knowledge transfer process in between two firms to a varying degree. Moreover, scholars have argued that similarity can be used as an indicator for the synergy potential of an M&A transaction, and a higher similarity between acquiror and target seem to be able to provide better results (e.g., Capron et al., 2001). On the other hand, complementarity differences may allow firms to redeploy for the valuable resources and achieve greater outcome through enhancement-based synergies. For example, Stahl & Voigt (2008) has demonstrated that differences in strategies and culture between merging firms may be a source of value creation and learning opportunity, thereby improving the post-M&A performance for the acquirer.

In the context of ESG, the significance of compatibility may be less relevant on the 'knowledge' or the learning process but rather on the overall organizational fit and culture. A firm's broad positioning on ESG issues, such as the environmental and social impacts or even development on human capital can all be considered as an insightful proxy that reflects the firm's culture (Alexandridis et al., 2015). A few scholars have in fact studied on the cultural similarities between acquirer and target. By using CSR as a proxy for corporate culture, the author finds that M&A deals conducted between firms with more similar CSR performance would not only have higher odds of deal completion rate but would also witness a higher combined announcement returns (Bereskin et al., 2018). Similarly, Vezer & Morrow (2017) has also illustrated the benefit of achieving 'ESG compatibility' between acquirer and the target. By studying 231 M&A deals completed between 2011 and 2016, the research has found that ESG compatible deals would

outperform incompatible deals by an average of 21% five years after completion. Overall, both of the studies have indicated that a similar orientation in terms of sustainability would benefit the firms and enable the acquirer to better integrate the target firm's corporate culture and business values. However, as demonstrated in the theory related to complementarity, the differences between two firms involved in a transaction may be beneficial to the overall deal outcome. Especially when it comes to the performance on ESG, an acquiror may be more directly benefited if the target has better firm reputation through the investment on sustainable activities.

Hypothesis 2 thus presents an opposing view to argue the potential effect of ESG compatibility on firm performance. ESG compatible deals, in this context, would refer to the discrepancy between acquiror and target's ESG performance (i.e., the more compatible a deal, the less discrepancy between acquiror and target's materiality scores).

H2a: The higher the ESG compatibility (i.e., lower complementarity) between the acquiror and the target, the more likely that the acquirer will experience a positive performance post-M&A.

H2b: The higher the ESG complementarity (i.e., lower compatibility) between the acquiror and target, the more likely that the acquirer will experience a positive performance post-M&A.

2.4. The Moderating Role of the Acquiror' s Acquisition Experience

It has been documented in the previous literature that acquiror's previous acquisition experience would enhance the overall integration and learning process, thereby providing a higher probability for the acquiror to achieve post M&A success (Conn et al., 2005). For

example, acquirors with prior deal experience may not only be more familiar with target selection and deal negotiation process but also demonstrate more efficiency when trying to pool resources from the rather separate entities (i.e., target and acquiror firm). Especially in the context of environmental and social policies, experienced acquirors tend to have higher ability in learning and utilizing the best practices from the target and the acquiror (Huang et al., 2020). Some of the early research has also highlighted on the connection between acquisition experience and acquirer's performance. Power (1982) indicates that previous acquisition experience can be used as an appropriate predictor for future acquisition process, and Kitching (1967) also shows that the potential problems that may occur within the process of acquisition (i.e., mismatch in managerial styles, threats of layoffs) can be mitigated if the management team knows how to consolidate firms by using sills presumably enhanced through previous experiences. Likewise, I would like to argue that acquirors with prior acquisition experience will be more likely to obtain more benefits when forming a relationship with a high-ESG target firm since they would be better at absorbing and combining resources at the post-deal process.

Hypothesis 3: The performance enhanced through target firm's materiality will be positively moderated by the acquiror's previous acquisition experience.

3. METHOD

3.1. Data and sample

The panel data for this research will be constructed with the domestic M&As taken place in the U.S. between 1st Jan. 2009 to 31st Dec. 2019. Although the considerable

ESG efforts have existed for many decades, it was around the 2010s that ESG became a 'hit' and gathered huge attentions from both investors and corporate executives. In fact, Cornell (2021) has revealed that studies related to ESG may be hindered by the relatively limited sample period, and unlike data on firm size and value, data on ESG is most likely constrained to start from 2009. Following the restrictive conditions used in Cho et al., (2021), the sample is adjusted based on the following criteria: (1) The M&A deal is completed, (2) the deal value is over 1 million USD, (3) the acquiror holds less than 50% of the target's share 6 months prior to announcement and owns more than 50% after the transactions, (4) exclusion of finance industry, (5) both target and acquirors have publicly available ESG scores and financial information. Since banks and insurance firms tend to follow different rules for financial statements, those industries will be excluded from the sample to reduce the potential bias. The M&A deals are extracted from the Thomson Securities Data Company (SDC) Platinum Mergers and Acquisitions, and ESG scores for each material sector are obtained from Refinitv Eikon, which is a database containing detailed ratings and scores starting from the year of 2002. The financial statement and other relevant variable were acquired from COMPUSTAT using firm ticker.

Based on the above factors, the final sample will be constructed with 111 dyads established between acquiror and target firm. Compared to the previous research, the sample size is more constrained since the panel requires not only the broader ESG category scores (i.e., E, S, G) but also the specific scores for each of the material category, thereby creating more firms with missing values that needed to be manually dropped from the sample.

Tabulation of year

	Freq.	Percent	Cum.
2009	5	4.50	4.50
2010	4	3.60	8.11
2011	8	7.21	15.32
2012	5	4.50	19.82
2013	2	1.80	21.62
2014	7	6.31	27.93
2015	6	5.41	33.33
2016	15	13.51	46.85
2017	16	14.41	61.26
2018	18	16.22	77.48
2019	25	22.52	100.00
Total	111	100.00	

3.2. Variable description

In order to examine the acquiror's post-M&A performance, Return on Assets (ROA) and Return on Equity (ROE) will be used as two proxy variables in this research. ROA has been considered as an appropriate variable to capture the financial performance under a long-term perspective, including the effect of CSR performance on the bidder's performance after an acquisition (Bettinazzi & Zollo, 2017). Salvi et al. (2018) has also studied the impact of the target's ESG score on the acquiror's ROA. ROE, being defined as the ratio between a firm's net income and average shareholder equity, can also be an effective indicator for a firm's financial performance. In fact, several studies such as Nirino et al. (2021) and Ferrer (2012) have examined ROA and ROE separately in order to precisely capture a firm's potential outcome. Thus, the analysis for this research will be conducted based on these two financial indicators.

The independent variable, target firm's ESG materiality, will be calculated based on the measurement method suggested in Havlinova & Kukacka (2021). Refinitiv Eikon has selected 186 most relevant metrics among the total 450 sustainability metrics, and the

categories have been narrowed down to 10 by the author: Resource Use, Emissions, Innovation, Workforce, Human Rights, Community, Product Responsibility, Management, Shareholders, CSR Strategy. The material score is calculated based on the weighted sum of each ESG-related issue that has been categorized as 'material' based on the acquirer's industry, using the lagged variables a year prior to the acquisition year. Since different ESG issues would 'matter' differently for each industry, the author has further identified the material issues (i.e., issues that are directly related to the firm's business core) based on the nature and characteristics of each industry.

Insert Figure 1 about here

For example, if a firm belongs under the Transportation industry, then the relevant material issues according to Table 1 would be 'Emissions, Workforce, Management, and Shareholders'. Thus, the firm's material score can be calculated with the weighted score that takes into consideration of the respective score on each of the material category. The material score for the transportation industry would then be calculated with the following formula, where where $\sum wT = wE + wW + wM + wS$. Regardless of the target's industry, the target's material score will be calculated based on the acquirer's industry and will be computed with the respective scores on the relevant issues a year prior to the deal announcement.

$$\text{Material Score}_T = \frac{w_E}{\sum w_T} E_{Score} + \frac{w_W}{\sum w_T} W_{Score} + \frac{w_M}{\sum w_T} M_{Score} + \frac{w_S}{\sum w_T} S_{Score}$$

ESG compatibility will be measured with the absolute difference between the

acquirer's material score and the target firm's acquirer score. Ung & Urfe (2021) has adopted a 25-point threshold to distinguish between high and low ESG gaps between the target and the acquirer. By adopting the similar standard for the cut-off point, I have created a dummy variable and labeled dyads with less than 25-point difference in terms of ESG materiality score as 'compatible deal'. The *Materiality Gap* used to measure compatibility between acquirer and target will thus be calculated with the measurement below. With i being the acquirer's industry, the gap will be computed with the difference between the material score of firm m (the acquirer) and firm n (the target). Besides the materiality gap (i.e., using the acquirer and target's overall material performance), I also aim to examine the gap on a smaller scale – the difference between the acquirer and target's environmental, social and governance performance. The environmental gap, for example, will also be computed as a dummy variable with 1 indicating less than 25-point difference between acquirer and target's ESG score in the categories that fall into the environmental sector (i.e., Resource use, Emissions, Innovation).

$$\text{Materiality Gap}_{i,m,n} = \left| M_{i,m} - M_{i,n} \right|$$

The acquirer's previous acquisition experience will be measured as a continuous variable. Although several studies have included the overall accumulated acquirer experience, Laamanen & Keil (2008) has in fact argued that serial acquirer (i.e., acquirers establishing completed deals in the recent time period) may be a more accurate measure to capture the firm's learning experience and capability. Following suit, the acquirer experience in this research will be computed as the total number of completed deal experiences in the past 3 years prior to the deal announcement year.

The control variables will also be constructed with the lagged variables one year before the deal announcement year. Following the literature, we control for firm characteristics. Frist, Tobin's Q will be controlled for acquirer's potential growth opportunities (Dong et al., 2006). Firm size will be measured as the natural log value of the total asset, and other fundamental performance data such as sales and operating margin will also be included as control variables to measure the distinct effect of ESG materiality. The asset turnover ratio is also an indicator of how efficient a firm is able to generate revenue from its assets (Feng, 2021). The industry difference between acquirer and target will be controlled with a dummy variable. Since the concept of ESG materiality is largely dependent on the firm industry, it's important to distinguish between M&A deals with different industries between acquirer and target and those with overlapped industries.

Summary of Variables / Computing method	
Dependent variables	
ROA (at t+2)	Acquirer's Net Income / Asset two years post-deal
ROE (at t+2)	Acquirer's Net Income / Market value of common equity two years post-deal
Independent variables	[Lagged Variables]
Target Materiality	Weighted scores of target's ESG scores based on the acquirer's material sectors
Materiality Gap	Absolute difference between acquirer & target's material score, computed as dummy variable using 25-cutoff point
Environmental Gap	Absolute difference between acquirer & target's environmental score, computed as dummy variable using 25-cutoff point
Social Gap	Absolute difference between acquirer & target's social score, computed as dummy variable using 25-cutoff point
Governance Gap	Absolute difference between acquirer & target's governance score, computed as dummy variable using 25-cutoff poin
Acquisition Experience	Number of acquisitions conducted in the past 3 years before the deal
Control variables reflecting characteristics of acquirers [Lagged Variables]	
Firm Size	Natural logarithm of acquiror's total asset
Operating margin	Acquirer's EBIT / Sales revenue
EBIT	Acquirer's earning's before interest
Asset turnover	Acquirer's Sales / Asset
Tobin's Q	Acquirer's book value of assets – book value of common equity + the market value of common equity

Control variables reflecting characteristics of targets [Lagged Variables]	
Firm Size	Natural logarithm of target's total asset
Operating margin	Target's EBIT / Sales revenue
EBIT	Target's earning's before interest
Asset turnover	Target's Sales / Asset
Tobin's Q	Target's book value of assets – book value of common equity + the market value of common equity
Other control variables	
Industry Relatedness	Dummy variable computed based on acquiror & target's SIC code

*Other factors including deal size and firm status were controlled when retrieving for the raw data

3.3. Analysis

Because the dependent variable is continuous, the analysis will be conducted through the linear regression models using ordinary least squares with robust standard errors. The industry and year-effect will thus be controlled through control variables. Since dyadic clustering is commonly used to estimate the dyad-level outcomes, the variables will be clustered based on the unique ID created for each dyadic structure between acquiror and target.

4. RESULTS

Descriptive statistics and bivariate correlations are presented in Table 1. Table 2 provides a dyad-level analysis on the effect of target's ESG materiality on acquirer's post-deal performance measured in terms of ROA, and Table 3 presents the results regressed upon ROE. In both tables, Model 1 includes only control variables reflecting the acquirer and target firm's characteristics. Model 2 presents the main hypothesis and examines the effect of target's materiality on acquirer's performance.

Insert Table 1 about here

In Table 2, the relationship was found to be significant and supports Hypothesis 1 (β= 0.0143, $p < 0.05$), thus suggesting a positive relationship between target's ESG materiality and acquirer's performance in terms of ROA. As for the effect of ESG materiality on acquirer's ROE, the result was marginally significant (β= 0.0187, $p < 0.1$) as illustrated in Table 3. Model 3 examines the gap between the acquirer and target's ESG materiality score. The negative coefficient (β= -0.043, $p < 0.05$) for ROA provides strong support for Hypothesis 2a, which indicates that larger gap between acquirer and target's material performance may in fact deteriorate a firm's post-merger financial performance. As for ROE, the result also demonstrates a negative coefficient (β= -0.039) but not statistically significant enough to support the hypothesis. Nevertheless, the negative correlation indicates the importance of compatibility within the process of an M&A deal.

Insert Table 2 about here

Insert Table 3 about here

While the moderating effects are significant for both of the financial indicators, the results do not provide support for Hypothesis 3. The statistically negative coefficient of *Target Materiality X Acquisition Experience* indicates that more frequent acquires may in fact benefit less from the sustainable performance of the target firm in the recent deal.

Environmental, Social and Governance Gap

Model 4, 5 and 6 investigate for the pre-deal gaps within the social, environmental and governance dimensions. Among the three categories, only *Social Gap* turns out to be significant (β= -0.0374 for ROA and β= -0.0665 for ROE), suggesting the potential importance for acquirer and target to consider the general 'fit' within the performance in their social sectors (i.e., workforce, human rights, community, product responsibility). The negative coefficients indicates that the compatibility between acquirer and target's social performance may enhance a firm's post acquisition performance. I have also examined the 'match' between different dimensions (e.g., pre-deal gap between the acquirer's social performance and target's environmental performance) as well as the direction correlation, but there was no significant result in those analysis.

5. DISCUSSION AND CONCLUSION

The goal of this research is to examine 1) whether an acquirer would benefit more from acquiring a target with similar ESG orientation (i.e., having outstanding ESG performance in the sectors that would be directly related to the acquirer's core business values) 2) how the size of the pre-deal gap would affect an acquirer's long-term performance. The results provide strong support for the relationship between target's materiality and acquirer's post-acquisition performance, but the pre-deal gap was only significant in the *Social* sector, indicating the potential benefit for a firm to acquire targets with similar *Social* orientation but not necessarily in the other sectors. The third hypothesis was not supported and the results instead indicate an opposite direction of relationship (i.e., more experienced acquirer tend to benefit less from the target's sustainable orientation). Although contradicting with the proposed hypothesis, this result can be partially explained

with the existing literatures that present a rather different view on acquirer's acquisition experience. For example, Kusewitt (1985) found a significant negative relationship between the number of acquirer's previous acquisitions and firm performance, providing support for the existence of 'corporate indigestion' and inefficient consolidation within the process of M&A. Hsu & Shiu (2010) also presents findings for the negative aspects of 'frequent bidder' and highlights that acquirers with above-average acquisition experience may perform worse than infrequent bidders as overconfidence may lead bidders to not only bid too aggressively but also have an overly optimistic view on the target firm

This study makes the following contributions to the literature. First, the research provides a narrower perspective by focusing on the 'materiality' aspect within ESG and can be used to expand the existing literature that examines ESG within the context of M&A. With 'synergy gains' being a frequently emphasized topic in the dyadic literature, the 'compatibility' illustrated in the analysis will contribute to the line of literature arguing the potential impact of CSR similarities in creating takeover synergies between acquirer and target firm (e.g., Glaister & Ahammad, 2013; Bereskin et al., 2018). From the managerial perspective, ESG should be examined from a variety of aspects when being incorporated in the decision making process. For example, the conventional notion of 'the higher ESG, the better' may be misleading as a firm's sustainable orientation (i.e., discovering the sectors relevant to a firm's primary business goal) may impose more impact than the overall ESG score measured under the broader categories.

The study also contains several limitations. First, the process of M&A itself is inherent to a self-selection mechanism since the probability for a target to receive a bid and ratings is mostly non-random. The study on ESG also contains a potential bias as firms

with relatively good ESG performance tend to be more willingly disclose their actions more than those with worse performance (Hummel & Schlick, 2016). The variance in the rating standard among different institutions (e.g., Refinitiv, MSCI) may also yield different results. To resolve for such issue, a few studies have conducted analysis on different metrics as a means of robustness check. Due to data availability, I was not able to fully examine the validity of the result by utilizing multiple sources. Another possible issue is that the materiality (i.e., importance and relevance to a firm) may be altered over time due to the various internal and external changes faced by each industry. Since this research has utilized the industry characteristics as a determining factor to decide on the 'material' issues, the finding may not be consistent over time and should be applied with new criteria or standard in the future. Lastly, the contextual limitations also impose a major risk to this research. The sample of firms used for analysis was rather limited due to the exclusion of missing variables, mostly on non-listed target firms that do not have publicly available financial data. The difference in the results presented on the two financial indicators, ROA and ROE, also deserves a closer attention in order to accurately attribute the impact of ESG materiality on the specific area.

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TABLES AND FIGURES

Figure 1 Material categories as disclosed in Havlinova & Kukacka (2021)

Pillar	Category	Metrics	Weight
1 Environmental	1.1 Resource Use	20	15%
	1.2 Emissions	28	15%
	1.3 Innovation	20	13%
2 Social	2.1 Workforce	30	13%
	2.2 Human Rights	8	5%
	2.3 Community	14	9%
	2.4 Product Responsibility	10	4%
3 Governance	3.1 Management	35	17%
	3.2 Shareholders	12	5%
	3.3 CSR Strategy	9	3%

No.	Industry (sub)group	Material Issues	Immaterial Issues
I.	**Basic Materials:** chemicals, mineral resources (metals & mining, constr. materials), containers & packaging	1.1, 1.2, 2.1, 2.4, 3.2	1.3, 2.2-3, 3.1, 3.3
II.	**Consumer Cyclicals**		
a.	**Automobiles & Auto Parts**	1.1-3, 2.1, 2.4, 3.2	2.2-3, 3.1, 3.3
b.	**Cyclical Consumer Products:** home building & construction, furnishing, household goods, leisure, toys, textiles	1.1, 1.3, 2.4, 3.2	1.2, 2.1-3, 3.1, 3.3
c.	**Cyclical Consumer Services:** media, publishing, hotels, entertainment	1.1, 2.1, 2.3-4, 3.2	1.2-3, 2.2, 3.1, 3.3
d.	**Retailers:** apparel, electronics, cars, dept./discount stores, personal care	1.1, 2.3-4, 3.2-3	1.2-3, 2.1-2, 3.1
III.	**Consumer Non-Cyclicals:** food & beverages & drug (retail), personal & household products and services	1.1-3, 2.3-4, 3.2-3	2.1-2, 3.1
IV.	**Energy:** fossil fuels	1.1-3, 2.1-2, 3.1-3	2.3-4
V.	**Financials:** banking & investment services, insurance	2.3-4, 3.1-3	1.1-3, 2.1-2
VI.	**Healthcare:** healthcare services & equipment, pharmaceuticals & medical research	2.2-4, 3.1-3	1.1-3, 2.1
VII.	**Industrials**		
a.	**Industrial & Commercial Services:** business support, compliance, staffing, information services, rating agencies, transactions, environmental services, construction & engineering services	2.1, 2.4, 3.1-2	1.1-3, 2.2-3, 3.3
b.	**Industrial Goods:** machinery, tools, heavy vehicles, trains, ships, aircraft manufacturing, aerospace, defense	1.1-3, 2.1, 2.4, 3.1-2	2.2-3, 3.3
c.	**Transportation:** airlines, logistics	1.2, 2.1, 3.1-2	1.1, 1.3, 2.2-4, 3.3
VIII.	**Real Estate**	1.1-3, 2.4, 3.1-2	2.1-3, 3.3
IX.	**Technology**		
a.	**Fintech & Infrastructure**	2.1, 2.3-4, 3.1-3	1.1-3, 2.2
b.	**Software & IT Services:** software, applications, servers, cloud, social media, search engines, internet security	1.1, 2.1-4, 3.1-2	1.2-3, 3.3
c.	**Technology Equipment:** PCs, phones, semiconductors, electronic equipment & parts, communications & networking	1.1-3, 2.1, 2.4, 3.2	2.2-3, 3.1, 3.3
d.	**Telecommunication Services**	1.1, 2.3-4, 3.1-2	1.2-3, 2.1-2, 3.3
X.	**Utilities:** electric, water, gas	1.1-3, 2.1, 2.3, 3.2-3	2.2, 2.4, 3.1

Table 1 Descriptive Statistics and Correlation Table

Variables	Mean	S.D.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1) ROA	0.038	0.101	1.000																				
(2) ROE	0.019	0.195	0.878	1.000																			
(3) Target Materiality	54.097	23.669	0.153	0.099	1.000																		
(4) Materiality Gap	0.528	0.490	-0.165	-0.073	-0.255	1.000																	
(5) Social Gap	0.545	0.50	-0.157	-0.115	-0.244	0.507	1.000																
(6) Environmental Gap	0.528	0.501	-0.119	-0.075	-0.180	0.747	0.477	1.000															
(7) Governance Gap	0.732	0.445	0.034	0.029	-0.397	0.381	0.294	0.384	1.000														
(8) Acquirer Firm Size	9.015	1.549	0.139	0.073	0.140	0.072	0.045	0.020	0.198	1.000													
(9) Target Firm Size	9.907	1.869	-0.048	-0.023	0.600	-0.230	-0.193	-0.241	-0.453	0.064	1.000												
(10) Acquirer Liquidity	2.053	1.926	0.018	-0.012	-0.033	0.016	-0.025	0.064	-0.025	-0.361	-0.290	1.000											
(11) Target Liquidy	1.950	0.911	0.123	0.071	-0.311	-0.113	-0.046	-0.024	0.223	0.148	-0.413	0.219	1.000										
(12) Acquirer Operating Margin	0.157	0.140	-0.031	-0.189	0.021	-0.078	-0.085	-0.089	0.040	0.280	-0.089	-0.045	0.122	1.000									
(13) Target Operating Margin	2.100	6.208	-0.086	-0.053	0.314	-0.340	-0.290	-0.295	-0.491	-0.319	0.465	-0.080	-0.179	-0.021	1.000								
(14) Acquirer Asset Turnover	0.722	0.426	0.041	0.085	-0.198	-0.066	0.119	-0.022	0.082	-0.303	-0.168	0.015	0.096	-0.353	-0.027	1.000							
(15) Target Asset Turnover	0.623	0.541	-0.038	0.008	-0.080	0.131	0.014	-0.087	0.085	-0.098	-0.348	0.226	0.059	-0.210	-0.173	0.322	1.000						
(16) Acquirer EBIT	2239.844	4375.687	0.216	0.060	0.088	0.051	0.004	0.050	0.186	0.598	-0.077	-0.073	0.252	0.418	-0.148	-0.077	-0.038	1.000					
(17) Target EBIT	4496.194	8429.724	0.003	0.012	0.461	-0.390	-0.321	-0.341	-0.523	-0.069	0.657	-0.125	-0.224	0.063	0.666	0.018	-0.183	0.027	1.000				
(18) Acquirer Tobin's Q	1.916	0.969	0.165	-0.076	-0.125	-0.064	-0.075	-0.014	0.030	-0.063	-0.240	0.113	-0.003	0.362	-0.100	0.071	-0.082	0.285	-0.100	1.000			
(19) Target Tobin's Q	1.776	1.039	0.049	0.052	-0.011	-0.133	-0.155	-0.112	-0.009	0.141	-0.190	0.004	0.344	0.049	-0.052	-0.018	0.225	0.264	-0.020	0.139	1.000		
(20) Industry Relatedness	0.618	0.488	-0.068	-0.076	0.216	-0.115	-0.013	-0.173	-0.099	0.103	0.102	-0.129	0.021	0.056	0.013	-0.220	0.059	0.031	0.055	0.040	0.004	1.000	
(21) Acquirer Experience	1.138	1.462	0.095	0.033	0.138	0.007	-0.003	0.034	-0.056	0.193	0.069	-0.042	0.001	0.300	0.088	-0.245	-0.041	0.264	0.103	0.022	-0.024	0.029	1.000

Table 2 Panel Regression on Return on Asset (ROA)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6	(7) Model 7
Target Materiality		**0.0143*** **					**0.0194** **
		(0.00515)					(0.00742)
Materiality Gap			**-0.0430** **				
			(0.0238)				
Environmental Gap				**-0.0348**			
				(0.0220)			
Social Gap					**-0.0374***		
					(0.0200)		
Governmental Gap						**-0.000356**	
						(0.0255)	
Acquisition Experience							0.252**
							(0.125)
Target Materiality X Acquisition Experience							**-0.0377***
							(0.0199)
Acquirer Tobin's Q	0.0246***	0.0264***	0.0223***	0.0232***	0.0212**	0.0246***	0.0281***
	(0.00886)	(0.00855)	(0.00814)	(0.00820)	(0.00844)	(0.00924)	(0.00881)
Acquirer Firm Size	0.0194	-0.00272	0.0126	0.0138	0.0201	0.0196	0.0108
	(0.0101)	(0.0100)	(0.0102)	(0.0101)	(0.0100)	(0.0108)	(0.00995)
Acquirer Liquidity	-0.00302	-0.00593	-0.00168	-0.00127	-0.00244	-0.00301	-0.00427
	(0.00736)	(0.00769)	(0.00662)	(0.00673)	(0.00716)	(0.00775)	(0.00738)
Acquirer Operating Margin	-0.201*	-0.209*	-0.213*	-0.217*	-0.201*	-0.201*	-0.230*
	(0.115)	(0.112)	(0.122)	(0.123)	(0.111)	(0.115)	(0.117)
Acquirer Asset Turnover	-0.0243	-0.0215	-0.0299	-0.0264	-0.0169	-0.0243	-0.0124
	(0.0277)	(0.0272)	(0.0305)	(0.0284)	(0.0266)	(0.0300)	(0.0284)
Acquirer EBIT	4.54e-06*	3.76e-06*	5.54e-06**	5.29e-06**	4.99e-06**	4.55e-06*	4.10e-06*
	(2.29e-06)	(2.18e-06)	(2.60e-06)	(2.57e-06)	(2.46e-06)	(2.30e-06)	(2.47e-06)
Target Tobin's Q	-0.0847	-0.0111*	-0.0109	-0.0966	-0.0100	-0.0849	-0.0956
	(0.00689)	(0.00580)	(0.00740)	(0.00713)	(0.00722)	(0.00647)	(0.00674)
Target Firm Size	-0.00152	-0.0109	-0.00191	-0.00299	-0.00306	-0.00154	-0.0121
	(0.0115)	(0.0114)	(0.0111)	(0.0115)	(0.0115)	(0.0127)	(0.0114)
Target Liquidity	0.0179	0.0246	0.0128	0.0147	0.0137	0.0179	0.0221
	(0.0155)	(0.0159)	(0.0140)	(0.0149)	(0.0148)	(0.0158)	(0.0159)
Target Operating Margin	-0.0178	-0.0223*	-0.0235*	-0.0219*	-0.0209*	-0.0178*	-0.0181
	(0.0117)	(0.0121)	(0.0132)	(0.00124)	(0.00123)	(0.00101)	(0.00110)
Target Asset Turnover	-0.0264	-0.0101	0.00478	-0.0843	-0.0500	-0.0268	-0.0147
	(0.0193)	(0.0164)	(0.0196)	(0.0190)	(0.0208)	(0.0205)	(0.0159)
Target EBIT	1.97e-06	1.77e-06	1.29e-06	1.59e-06	1.45e-06	1.97e-06	1.67e-06
	(1.69e-06)	(1.69e-06)	(1.70e-06)	(1.62e-06)	(1.62e-06)	(1.49e-06)	(1.71e-06)
Industry Relatedness	-0.0237*	-0.0332**	-0.0285*	-0.0283*	-0.0231	-0.0237*	-0.0304**
	(0.0141)	(0.0154)	(0.0149)	(0.0156)	(0.0140)	(0.0142)	(0.0146)
Constant	0.0246	0.0668	0.0858	0.0816	0.0747	0.0250	0.0267
	(0.0963)	(0.104)	(0.109)	(0.112)	(0.106)	(0.107)	(0.0963)
Observations	111	111	111	111	111	111	111
R-squared	0.129	0.188	0.160	0.151	0.155	0.129	0.210

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3 Panel Regression on Return on Equity (ROE)

VARIABLES	(1) Model 1	(2) Model 2	(3) Model 3	(4) Model 4	(5) Model 5	(6) Model 6	(7) Model 7
Target Materiality		**0.0187***					**0.0279***
		(0.0105)					(0.0150)
Materiality Gap			**-0.0399**				
			(0.0436)				
Environmental Gap				**-0.0485**			
				(0.0443)			
Social Gap					**-0.0665***		
					(0.0385)		
Governmental Gap						**0.00824**	
						(0.0440)	
Acquisition Experience							0.458
							(0.296)
Target Materiality X Acquisition Experience							**-0.0680***
							(0.0409)
Acquirer Tobin's Q	-0.0446	-0.0213	-0.0661	-0.0642	-0.105	-0.0407	0.00977
	(0.0131)	(0.0130)	(0.0130)	(0.0127)	(0.0127)	(0.0139)	(0.0136)
Acquirer Firm Size	0.0560	-0.233	-0.0077	-0.0223	0.0679	0.0244	0.0121
	(0.0158)	(0.0159)	(0.0160)	(0.0159)	(0.0157)	(0.0171)	(0.0160)
Acquirer Liquidity	-0.0104	-0.0142	-0.00920	-0.00800	-0.00941	-0.0107	-0.0112
	(0.0116)	(0.0127)	(0.0106)	(0.0105)	(0.0113)	(0.0122)	(0.0119)
Acquirer Operating Margin	-0.423*	-0.434*	-0.434*	-0.446*	-0.423*	-0.424*	-0.472*
	(0.235)	(0.235)	(0.248)	(0.254)	(0.230)	(0.236)	(0.255)
Acquirer EBIT	6.16e-06*	5.14e-06*	7.09e-06*	7.20e-06*	6.96e-06*	6.06e-06*	5.74e-06
	(3.42e-06)	(3.09e-06)	(4.08e-06)	(4.05e-06)	(3.84e-06)	(3.50e-06)	(3.72e-06)
Target Firm Size	-0.0121	-0.0244	-0.0125	-0.0142	-0.0149	-0.0117	-0.0265
	(0.0220)	(0.0243)	(0.0218)	(0.0226)	(0.0223)	(0.0240)	(0.0247)
Target Liquidity	0.0152	0.0239	0.0105	0.0108	0.00775	0.0153	0.0193
	(0.0244)	(0.0257)	(0.0226)	(0.0241)	(0.0236)	(0.0249)	(0.0258)
Target Operating Margin	-0.0323	-0.0381*	-0.0376*	-0.0381*	-0.0379*	-0.0314*	-0.0306
	(0.0199)	(0.0209)	(0.0220)	(0.0206)	(0.0210)	(0.0172)	(0.0204)
Acquiror Asset Turnover	-0.0181	-0.0144	-0.0233	-0.0210	-0.00489	-0.0193	0.00210
	(0.0461)	(0.0453)	(0.0507)	(0.0479)	(0.0448)	(0.0493)	(0.0478)
Target Asset Turnover	-0.0185	-0.0283	-0.0156	-0.0266	-0.0227	-0.0175	-0.0366*
	(0.0279)	(0.0230)	(0.0294)	(0.0267)	(0.0304)	(0.0291)	(0.0216)
Target EBIT	3.95e-06	3.69e-06	3.32e-06	3.42e-06	3.02e-06	4.09e-06	3.50e-06
	(3.93e-06)	(3.86e-06)	(3.72e-06)	(3.64e-06)	(3.62e-06)	(3.49e-06)	(3.83e-06)
Target Tobin's Q	-0.00808	-0.0429	-0.0305	-0.0246	-0.0358	-0.00544	-0.0137
	(0.0116)	(0.0103)	(0.0122)	(0.0118)	(0.0121)	(0.0107)	(0.0122)
Industry Relatedness	-0.0326	-0.0450	-0.0370	-0.0390	-0.0316	-0.0325	-0.0399
	(0.0254)	(0.0306)	(0.0281)	(0.0294)	(0.0250)	(0.0257)	(0.0281)
Constant	0.222	0.277	0.279	0.301	0.311	0.213	0.204
	(0.155)	(0.180)	(0.192)	(0.208)	(0.190)	(0.183)	(0.148)
Observations	111	111	111	111	111	111	111
R-squared	0.089	0.116	0.096	0.100	0.111	0.089	0.134

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

국문 초록

The Potential Effects of ESG Materiality and Compatibility on Post-M&A Performance

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선행 연구에서는 ESG의 역할과 ESG가 기업 성과, 사회적 인식 및 주주 가치 등 다양한 측면에서 기업에 미칠 수 있는 영향에 대해 탐구해 왔다. 본 연구에서는 보편적인 ESG 등급에 초점을 두는 것 보다 인수 기업의 산업 특성 기반으로 특정한 ESG 분야를 선출하여 이와 관련된 피인수 기업의 ESG 경영이 기업 성과에 미칠 수 있는 영향에 대해 살피고자 한다. 이론적 관점을 검증하기 위해 총 111건의 인수합병 사례를 분석하고 피인수 기업의 ESG 중대성(materiality) 점수를 산출하였다. 분석 결과, 피인수기업의 ESG 중대성(materiality)이 인수기업의 장기적 재무성과에 긍정적 영향을 미칠 것으로 나타났다. 또한 일치성 이론(Congruence Theory) 관점에서 출발해서 두 기업의 ESG 격차를 분석하였고 ESG 측면에서 인수기업과 피인수기업의 조직적 적합성에 대해 검토를 하였다. 이를 통해 사회적(Social) 분야에서 두 기업의 격차가 작을수록 기업 성과가 더욱 향상될 것이라는 연구결과를 도출하였다.

주요어 : ESG 중대성, 전략적 차이, 비재무적 성과, 인수합병 성과

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