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Dear Solovida, Grace; Latan, Hengky

It is a pleasure to accept your manuscript MEQ-09-2020-0202.R4, entitled "Achieving Triple Bottom Line Performance: Highlighting the Role of Social Capabilities and Environmental Management Accounting" in its current form for publication in Management of Environmental Quality. Please note, no further changes can be made to your manuscript.

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Thank you for your contribution. On behalf of the Editors of Management of Environmental Quality, we look forward to your continued contributions to the Journal.

Yours sincerely,
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Achieving Triple Bottom Line Performance: Highlighting the Role of Social Capabilities and Environmental Management Accounting

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Achieving Triple Bottom Line Performance: Highlighting the Role of Social Capabilities and Environmental Management Accounting

Abstract

Purpose – The relationship between the elements of the Triple Bottom Line (TBL) is a controversial area that is constantly debated in the sustainability literature. Our study addresses this debate by testing the relationships between the elements of TBL while considering Environmental Management Accounting (EMA) as a mediating influence.

Design/methodology/approach – This paper examines the survey responses of upper-level managers (i.e., general managers, operations managers, financial managers and environmental managers) from ISO 14001-certified manufacturing companies listed on the Indonesia Stock Exchange (IDX). The hypotheses were tested using a partial least squares (PLS) approach and bias-corrected and accelerated (BCA) bootstrap confidence intervals to test the significance between variables.

Findings – We found a direct relationship between the TBL elements and the role of EMA and social performance (CSP) in mediating the relationship between economic performance (CFP) and environmental performance (CEP).

Research limitations/implications – Our research also provides new insights into the progress of the Social Resource Based View (SRBV) theory, where the social element missing from the TBL approach can be found.

Practical implications – The findings of this article imply that it is worthwhile to invest in corporate sustainability, because it is thereby possible to simultaneously achieve economic, environmental and social performance, since such elements are truly integrated. In addition, possession of EMA management tools is necessary to enhance the relationships between CFP and CEP. Furthermore, CSP seems to constitute an important bond between CFP and CEP, indicating that the social element of the TBL is necessary to achieve truly competitive performance.

Originality/value – This study contributes to the corporate environmental management literature by providing empirical evidence of TBL elements.

Keywords Corporate Sustainability, Triple Bottom Line, Environmental Management Accounting, Corporate Environmental Performance and ISO 14001.

Paper type Research paper

1. Introduction

In the past decade, research topics within the fields of sustainability, cleaner production and environmental issues have been discussed continuously among scholars in various disciplines (Aguinaga et al. 2018; Hasan et al. 2018; Nicoletti Jr et al. 2018; Orlitzky et al. 2017; Sénéchal 2017; Solovida and Latan 2017; Wang and Sarkis 2017). In particular, the concept of the ‘triple bottom line’ (TBL) has long been a theoretical blueprint (Elkington 1998, 2004). However, to date, little is known about the relationships between the elements which make up TBL, and there is a lack of empirical studies addressing this topic as a whole (Gimenez et al. 2012; Svensson et al. 2018).

Specifically, rather than thoroughly analyzing the relationship between TBL elements, previous studies have tested the elements of TBL separately. For example, most research has devoted its attention to the relationship between corporate economic performance (CFP) and corporate environmental performance (CEP) (Albertini 2013; Gras and Krause 2018; Journeault 2016; Latan et al. 2018b; Wagner 2015; Trumpp and Guenther 2017), providing mixed results. Such research ignores social performance as the third element of TBL (Cegarra-Navarro et al. 2016; Epstein et al. 2015; Ullmann 1985). On the other hand, most studies have also focused on the relationship between corporate social responsibility (CSR) and financial performance, and have not achieved conclusive results (Brammer and Millington 2008; Beurden and Gossling 2008; Orlitzky et al. 2003; Waddock and Graves 1997). Because there is no general consensus on the relationships between the elements of TBL, and because there is lack of studies that provide concrete evidence on TBL, there is an urgent demand to re-examine these relationships in a single model (Svensson et al. 2016).

This article aims to fill this persistent gap by testing the elements of TBL in a single model using ISO 14001-certified manufacturing companies listed on the Indonesia Stock Exchange (IDX). In addition, we also add environmental management accounting (EMA) as a mediator in the relationships between TBL elements (Burritt et al. 2009; Christ et al. 2016; Jasch 2006). We argue that EMA plays an important role in bridging the relationships between TBL elements, by providing information that is useful to managers’ decision making.

EMA can be understood as a set of management tools that allows companies to improve their CFP, CEP and CSP by providing monetary information, such as costs and revenue, as well as non-monetary information such as energy, water, materials or carbon dioxide emissions (Jasch 2006; Christ and Burritt 2013). Several previous studies have

indicated that EMA is a useful instrument for improving CEP (Ferreira et al. 2010; Solovida and Latan 2017) in relation to providing information for companies (Burritt and Saka 2006; Burritt et al. 2019).

We tested our model and collected data in Indonesia, one of the countries with the largest levels of economic growth in the world, and part of the G20. Indonesia is predicted to become the fourth strongest economy in the world in 2045, according to research conducted by PricewaterhouseCoopers (PwC) in 2017. In addition, Indonesia offers an interesting phenomenon in terms of the TBL model, where previous studies have reported a lack of CEP in firms operating in Indonesia (Burritt et al. 2019; Latan et al. 2018a). According to the United Nations Environment Program (UNEP) report in 2018, Asia-Pacific is the fastest-growing region in the world. This economic boom has lifted many out of poverty, but it has also caused significant environmental degradation, with negative effects on human wellbeing. Because of these important issues in Indonesia, research specific to the Indonesian context has become an urgent demand.

Our study extends the state-of-the-art research in the field of sustainability and cleaner production and provides original evidence in three ways. First, we answer the research call from Svensson et al. (2016) to test the elements of TBL in a single comprehensive model. Our study is the first to address these gaps by providing original evidence on the relationship between TBL elements in a single comprehensive model for the Indonesian context – a country that is part of the G20. Second, we reconcile the mixed results found in previous studies related to elements of TBL. Our research provides new insights into the progress of the Social Resource Based View (SRBV) theory (Tate and Bals 2018), where the social element missing in the TBL approach is included. While a plethora of emerging research studies has dealt separately with the relationships between CFP and CEP, as well as CSR and CFP, the results are still unclear and contradict each other (Beurden and Gossling 2008; Dixon-Fowler et al. 2013; Orlitzky et al. 2003). For example, the relationship between CFP and CEP still presents inconclusive results. More specifically, five research streams have been produced, in which the relationship between CFP and CEP has been found to have either a positive, neutral or negative effect and is either U-shaped or inverted U-shaped (Fujii et al. 2013; Latan et al. 2018b; Sun et al. 2018; Trumpp and Guenther 2017). Our study re-examines the relationship between TBL elements by considering the role of EMA as a mediator. Jasch (2006) argues that EMA is a useful tool for providing information to improve CEP. Based on our best knowledge, our research is the first to test the TBL model while also

considering the role of EMA. Therefore, we add new empirical evidence to the sustainability and cleaner production literature.

Finally, our research contributes fresh empirical evidence in the context of developing countries – in this case, Indonesia. Although a small number of studies related to TBL and EMA have been conducted in the Asia-Pacific region, including Australia, China, Japan, Philippines and Thailand (Burritt et al. 2019; Burritt and Saka 2006; Kuasirikun 2005; Schaltegger et al. 2008), most of this research has been carried out through case studies. Although qualitative studies have indicated that the elements of TBL are interrelated with one another in decision making for business sustainability, it is important to examine the relationships between these elements empirically. Hence, our study contributes by empirically and simultaneously testing the relationships between the TBL's elements in the Indonesian context.

The remainder of this paper is organized as follows. The next section presents the theoretical background and development of hypotheses, followed by the research methodology. Next, we present our empirical results. Finally, we discuss these results and provide implications that may be useful for both academics and practitioners.

2. Theoretical Background and Development of Hypotheses

2.1. *The natural resource-based view (NRBV) for sustainability*

One of the mainstream theories in sustainability which supports the relationship between CFP and CEP is the natural resource-based view (NRBV) (Hart 1995; Hart and Dowell 2011). The NVRB is an extension of the resource-based view (RBV), which focuses not only on CFP, but also on sustainable development, including CEP. The basic assumption of the RBV is that the basis for firms' competitive advantage lies in the application of a bundle of valuable resources and capabilities to gain efficiency and improve business performance (Barney 1991; Newbert 2007). This implies that only firms which can use resources effectively and have the ability to innovate will gain competitive advantage and, therefore, achieve superior performance. Sustainable competitive advantage is determined by the firm's ability to reconfigure its valuable and idiosyncratic resources. According to the RBV, these resources should be inimitable, rare and non-tradable (Barney 1991; Hart 1995; Russo and Fouts 1997).

Hart and Dowell (2011) evaluated fifteen years of the development of the RBV, based on various results of empirical findings concerning the propositions in the RBV, and

thus formulated the NRBV. Hart and Dowell (2011) argue that the RBV does not consider CEP, while environmental and sustainability issues have more recently become widely discussed topics. Therefore, the RBV was revisited. Building on the logic of the RBV, the NRBV describes how firms can achieve competitive advantage by means of cost efficiency relating to the environment and minimizing the entire value chain of the firm. Specifically, the NRBV consists of three interrelated strategies: (1) pollution prevention, which focuses on minimizing waste, emissions and effluents with the aim of increasing efficiency and reducing costs; 2) product stewardship, which focuses on minimizing the entire value chain costs of products and thus expands the scope of pollution prevention; and (3) sustainable development, which focuses on sustainable growth of the firm while reducing environmental damage. Hence, the NRBV strategy emphasizes not only financial growth, but also environmental aspects (Hart and Dowell 2011).

However, neither RBV nor NRBV take into account the social dimension of TBL, creating a persistent gap in the sustainability literature. As a result, a large number of studies use the term ‘sustainability’ but, in fact, only investigate CFP and CEP. Driven by this gap, Tate and Bals (2018) propose to incorporate the social element of TBL as a complement to the propositions expressed in RBV and NRBV. Thereby, the social resource-based view (SRBV) is created, to show how social capabilities can be used to achieve competitive advantage. Tate and Bals (2018) suggest that the three legs of TBL – CFP, CEP and CSP – must be connected to achieve shared TBL value creation.

2.2. *The social resource-based view (SRBV) for sustainability*

Recently, Tate and Bals (2018) have proposed the social resource-based view (SRBV), which includes social capabilities in the achievement of competitive advantage. They argue that social performance has received too little attention in the context of business performance and sustainability. According to Tate and Bals (2018), RBV and NRBV do not capture social performance, the third element of the TBL model. This neglect is due to the RBV focusing on CFP in order to maximize profits, while the NRBV focuses on CEP for the preservation of the natural environment; neither focuses on social capabilities. Therefore, the SRBV complements RBV and NRBV by focusing more on CSP than CFP and CEP. Inspired by RBV and NRBV, SRBV uses two main strategies: 1) a mission-based approach, which focuses on maximizing social benefits while breaking even and becoming profitable in order to perpetuate the business model; and 2) stakeholder management, which focuses on

maximizing support in terms of products, information and funds from a broad stakeholder base (Tate and Bals 2018).

In this paper, we examine the relationships between elements of the TBL model – CFP, CSP and CEP– while considering EMA as a mediator in these relationships. We test this model simultaneously and explain the relationship between variables based on our conceptual framework and the results of previous studies, and thus derive our hypotheses. First, we hypothesize the direct effects of the relationships between CFP, CSP and EMA on CEP. Second, we hypothesize the indirect effects between these relationships. Figure 1 presents our theoretical model.

2.3. The relationship between TBL elements – economic, social and environmental performance

Topics related to social and environmental issues began to be studied around the 1970s, but interest in such issues has grown exponentially in the past decade. Nowadays, firms are not solely focused on short-term performance through a reliance on CFP, but also consider sustainable performance, which depends on three dimensions: the social dimension, relating to community welfare; the environmental (or ecological) dimension, which relates to the preservation of the natural environment; and the financial dimension, aimed at cost efficiency and boosting benefits (Svensson et al. 2016; Sénéchal 2017).

Following RBV, NRBV and SRBV, CFP is the first pillar to support sustainable performance. Here, the capabilities of firm in developing and managing a bundle of resources such as technology, design, procurement, production, distribution and service are the main keys to achieving competitive advantage (Barney 1991; Hart 1995; Hart and Dowell 2011; Russo and Fouts 1997; Tate and Bals 2018). The goal is to achieve cost differentiation, and to gain a more advantageous position than competitors. A firm that has grown in terms of CFP will in turn pursue sustainability performance by focusing on improving CSP and CEP. By focusing on CSP and CEP, a firm will gain additional benefits and reduce costs across the entire value chain. Hence, an increase in CFP will positively influence the firm's CSP and CEP. For example, companies can adopt environmentally friendly technologies, conduct R&D to minimize environmental damage and create programs for social responsibility. All of these actions have an impact not only on cost efficiency, but also on reputation, image and organizational learning (Lankoski 2008; Hart and Dowell 2011; Tate and Bals 2018).

Several previous studies have found a positive effect based on the relationships between CFP and CEP (Svensson et al. 2018; Testa and D'Amato 2017), CFP and CSP

(Brammer and Millington 2008; Brammer et al. 2006; Waddock and Graves 1997; Scholtens 2008; Van der Laan et al. 2008) and CSP and CEP (Garcia-Castro et al. 2010; Orlitzky et al. 2017; Svensson et al. 2018). Based on the above discussion, we derive the following hypotheses:

H1: CFP has a positive and direct effect on CEP.

H2a: CFP has a positive and direct effect on CSP.

H2b: CSP has a positive and direct effect on CEP.

2.4. Indirect effects between TBL elements through EMA

Over the past decade, the study of relationships among elements of TBL has had a prominent place in the sustainability literature. However, although hundreds of separate studies have been carried out and reported, inconsistent and disappointing results have provoked recent debate. This is because the relationships between the elements of TBL have continually produced mixed results. Several meta-analytical studies have revealed that these mixed results found by scholars are determined from the role of the third variable. For example, Dixon-Fowler et al. (2013) and Grewatsch and Kleindienst (2017) suggest introducing mediator or moderator variables into the relationships between these TBL elements. Meanwhile, a study conducted by Svensson et al. (2018) shows that the role of the third variable works well in relations between TBL elements. Specifically, Svensson et al. (2018) found that CSP mediated the relationship between CFP and CEP.

Based on the logic of NRBV and SRBV (Hart and Dowell 2011; Tate and Bals 2018), firms that achieve superior performance are not only able to manage CFP, but also CSP and CEP. In this situation, a firm that has excelled in CFP can directly increase its CEP by adopting environmentally friendly technologies, adopting various quality standards, developing programs related to the environment and so on for cost efficiency (Lankoski 2008). Conversely, a firm that focuses on increasing CSP, will ultimately indirectly increase its CEP (Garcia-Castro et al. 2010; Orlitzky et al. 2017; Svensson et al. 2016), given that CSP and CEP are interconnected.

In addition, several scholars have indicated that EMA is an intermediary in the relationships between TBL elements (Ferreira et al. 2010; Christ and Burritt 2013; Solovida and Latan 2017). A firm that is successful in managing CEP requires a set of tools that can provide information for decision-making. EMA offers this information, providing information related not only to monetary such as costs and revenue, but also non-monetary information concerning energy, water, materials or carbon dioxide emissions. Previous research conducted

by Burritt et al. (2019), Ferreira et al. (2010) and Solovida and Latan (2017) indicates that EMA can mediate the relationship between CFP and CEP. Based on the above discussion, we derive the following hypotheses:

H3a: CFP has a positive and direct effect on EMA.

H3b: EMA has a positive and direct effect on CEP.

H4a: CFP has a positive and indirect effect on CEP through CSP.

H4b: CFP has a positive and indirect effect on CEP through EMA.

Figure 1 portrays the research framework empirically tested in this work.

*****PLEASE INSERT FIGURE 1 HERE*****

3. Research Method

3.1. Sample and data collection

The sample in this study is composed of upper-level managers (i.e., general managers, operations managers, financial managers and environmental managers) from ISO 14001-certified manufacturing companies listed on the Indonesia Stock Exchange (IDX). ISO 14001 is an international standard awarded to companies that have adopted environmentally friendly processes and products. Our sampling frame was determined based on data provided by IDX (www.idx.co.id) and the Indonesian Ministry of Environment and Forestry. According to this database, there were in 2018 a total of 285 companies with ISO 14001 certification operating in Indonesia. We contacted all of these companies to ask them to participate in our survey, and received approval from 109 companies.

After receiving approval, we conducted pre-testing to minimize potential bias and ensure the appropriate operation of the questionnaire before it was sent to the target respondents (Fowler Jr 2013; Groves et al. 2009). We held discussions together with four academics and business professionals to assess the content validity of the questionnaire (Rossiter 2011, 2013). The academics consulted were senior researchers in the field of environment and sustainability, with strong reputations in this field, while the business professionals were Chief Executive Officers (CEO) and consultants. Some improvements were made to the questionnaire in terms of phrasing, clarity and accuracy of the questions in order to be understandable and avoid questions which were vague, ambiguous, or difficult to answer. The final version of this questionnaire was sent to 22 companies for preliminary analysis and we assessed the validity and reliability of the indicators in the model. The results

of our preliminary analysis indicated that the items used are valid and reliable for measuring variables in our model.

We conducted data collection between June and December 2018 using online surveys, as well as contacting each respondent via telephone calls and emails. We chose this method because it was considered effective for reaching a broad range of respondents at low cost (Dillman et al. 2014; Groves et al. 2009). In order to increase the response rate, we sent several reminder e-mails and made several phone calls to non-responders. We also guaranteed the anonymity of responses and did not disclose the identity of the companies. Finally, we provided a cut-off date of five months for completion of this survey for the purpose of testing non-response bias (Dillman et al. 2014; Fowler Jr 2013).

At the time of the deadline, we had received 91 returned questionnaires, and four of these were excluded due to incompleteness, giving an overall response rate of 19.95%. We argue that this response is acceptable for studies in sustainability and the environment (Dubey et al. 2017; Wijethilake 2017), with some studies giving rates lower than this threshold (Christ and Burritt 2013; Ferreira et al. 2010). However, in order to ensure that there were no biases or differences between our respondents and non-respondents, we tested non-response bias by comparing those who responded early and those who responded late (Clotey and Grawe 2014; Dalecki et al. 1993). We assume that late respondents are similar to non-respondents, in terms of time required to reply. We used a t-test to assess differences in the means of the two sample groups. Our results did not find significant ($p > 0.05$) differences between these groups of responders (see Table 1). In addition, we compared socio-demographic variables (i.e., gender and age) using a Bonferroni test to maintain the robustness of these results. Our results indicate a similar response rate across subgroups, which indicates that our data is free of non-response bias (Clotey and Grawe 2014; Groves 2006). Finally, we tested for common method bias (CMB), which is another potential source of bias when using the survey method (Podsakoff et al. 2012). We used full collinearity VIFs (AFVIF), an approach proposed by Kock (2017) to assess CMB between item correlations of two constructs. Our analysis results resulted in an AFVIF value of $2.887 < 3.3$, which indicates that CMB does not occur in our measurement. A summary of the profile of participating firms can be seen in Table 2 below.

*****PLEASE INSERT TABLE 1 HERE*****

*****PLEASE INSERT TABLE 2 HERE*****

3.2. Measurement items and scales

In survey-based studies, measurement scales and indicators are key elements in order to produce unbiased estimates. We used measurement scales and indicators adopted from previous studies in the field of environment and sustainability in order to avoid scale proliferation. We consider that these indicators have been validated through the test-retest method and are well established. We used multiple indicators rather than a single indicator to measure each construct in the model (Sarstedt et al. 2016a). This aims to reduce measurement errors and improve the validity and reliability of indicators. We measured CFP, CSP and CEP using indicators adopted from Svensson et al. (2016). We used a 7-point Likert scale with a total of 15 items, including 6, 4 and 5 indicators respectively to measure each construct. This scale ranges from 1 = “strongly disagree” to 7 = “strongly agree”. Hereinafter, we measure EMA using indicators adopted from Ferreira et al. (2010) and Christ and Burritt (2013). We used a 7-point Likert scale with 12 indicators to measure this construct. This scale ranges from 1 = “does not do at all” to 7 = “does to a great extent”.

3.3. Data analysis

The structural equation modeling (SEM) method is used to simultaneously test the relationships between variables in our model. Two SEM approaches – covariance-based SEM (CB-SEM) and variance-based SEM (PLS-PM)– are available to analyze our data (Jöreskog and Wold 1982). We chose PLS-PM due to some favorable considerations over CB-SEM. First, PLS-PM provides soft modeling, which uses non-parametric assumptions. Hence, PLS-PM does not depend on the parametric assumptions of Maximum Likelihood (ML), such as normality of data or model identification. In addition, PLS-PM avoids the problem of Heywood cases in our data. Second, PLS-PM has a “causal-predictive” nature and aims to predict relationships between variables rather than testing causality to confirm theories (Loehlin and Beaujean 2017). Here, this approach allows us to strike a balance between explanation and prediction, given that our model has a relative scarcity of theory and knowledge. Several simulation studies (Reinartz et al. 2009; Sarstedt et al. 2016b) have indicated that PLS-PM works well under conditions such as the model constellations in our analysis (i.e., where the sample size is medium). Finally, PLS-PM allows us to test the specific indirect effects between latent variables and conduct a series of robustness tests. In this case, PLS offers advanced features with a user-friendly interface.

In this study, we have followed the guidelines for reporting PLS-PM analysis which are well-documented in the literature (Hair et al. 2019; Latan 2018). Specifically, the

three main steps we conducted and reported are as follows. First, we assessed and evaluated the results of the measurement model. This is intended to assess the validity and reliability of construct indicators (i.e., convergent validity, discriminant validity and internal consistency reliability). Second, we assessed and evaluated the results of the structural model. This is intended to assess the overall fit of the model (i.e., r-square, effect size and predictive relevance) and test our hypothesis. Finally, we ran several series of robustness tests to ensure that our main results are not biased (i.e., endogeneity testing, unobserved heterogeneity and non-linear effects).

4. Results

We used the SmartPLS 3 software to estimate the parameters of our model (Ringle et al. 2015) using a number of specific settings, as follows (Hair et al. 2019; Latan 2018). In the PLS-PM algorithm settings, we set the maximum number of iterations at 300 through the path weighting scheme, with a stop criterion of 10^{-7} . In terms of bootstrapping, we used 10.000 subsamples, as recommended by Streukens and Leroi-Werelds (2016), to obtain stability of estimates. We selected confidence interval methods, namely bias-corrected and accelerated (BCa) bootstrapping. In addition, the level of significance we used to reject the null hypothesis was set at 5% (one-tailed). The results of the descriptive statistics for each indicator in the model are depicted in Tables 3 and 4.

4.1. Measurement model evaluation

Before we discuss the empirical findings of our hypothesis testing, it is pertinent to evaluate the measurement model and ensure that the indicators we used are valid and reliable. Drawing on standard evaluation guidelines (Hair et al. 2019; Latan 2018), we used several core metrics that are commonly used in PLS to report the assessment of measurement model, which includes convergent validity, discriminant validity and internal consistency reliability. Based on Tables 3 and 4, we obtained factor loading values for each indicator of the construct, which met the threshold value of > 0.708 and average variance extracted (AVE) of > 0.50 (Bandalos 2018; Hair et al. 2019; Latan and Noonan 2017). Only a few construct indicators (i.e., items of EMA) yielded values slightly below this threshold, which were, however, acceptable according to extant guidelines (Hair et al. 2017) to strengthen content validity (see Figure 2). We further assessed internal consistency reliability using Cronbach's alpha (α) and Dijkstra-Henseler's ρ_A tests. The threshold values for Cronbach's alpha (α) and

ρ_A are recommended to be > 0.70 . We obtained values above 0.85 for both measures for all constructs in the model (see Table 3 and 4), thus meeting this threshold value.

***** PLEASE INSERT TABLE 3 HERE *****

***** PLEASE INSERT TABLE 4 HERE *****

Finally, we used the heterotrait-monotrait (HTMT) ratio to evaluate discriminant validity in our PLS model, which is considered to outperform other traditional approaches (e.g., Fornell-Larcker criterion). The threshold for HTMT values of > 0.90 indicates conceptually similar constructs, and HTMT values < 0.85 indicate conceptually different constructs (Henseler et al. 2015; Franke and Sarstedt 2019). From Table 5, we conclude that discriminant validity is fulfilled for our data.

***** PLEASE INSERT TABLE 5 HERE*****

4.2. Structural model evaluation

After evaluating the measurement model, the second step is to assess the structural model. We assessed several core metrics including coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2) and variance inflation factor (VIF). In addition, we assessed our model's out-of-sample predictive power by conducting the PLS predict procedure (Hair et al. 2019; Latan 2018).

*****PLEASE INSERT FIGURE 2 HERE*****

***** PLEASE INSERT TABLE 6 HERE *****

We obtained both R^2 and adj. R^2 values as depicted in Table 6 for CFP, CSP, and CEP, which range from 0.259–0.686. According to Hair et al. (2018), these values are included in the weak to moderate category. The predictors in our model produced effect size (f^2) values ranging from 0.093–0.792 (i.e., included in the small and large categories), which shows the respective contributions of variance in the model. We also assessed the predictive relevance of our model (Q^2). Values of Q^2 larger than zero are considered meaningful. Our model produced Q^2 values ranging from 0.118–0.471, depicting small and medium levels of predictive relevance of the PLS model. We obtained VIF values for each predictor in the model of < 3.3 , which indicates no high correlation or collinearity between predictor variables in our cases.

Finally, we assessed the model’s out-of-sample predictive power by conducting the PLS predict procedure (Shmueli et al. 2016) to generate holdout sample-based point predictions for the constructs in our model. Because our sample size meets minimum requirements and is in the medium size category, we used ten folds and ten replications, comparing the root mean squared error (RMSE) values from the PLS-PM analysis with those generated by a naive linear benchmark (Hair et al. 2019). The results of our analysis indicate that PLS-PM yields lower prediction errors than the naive benchmark for all the indicators related to CFP, CSP, CEP and EMA, offering clear support for our model’s predictive power. In addition, $Q^2_{predict}$ values > 0 for all indicators suggest that our model outperforms the most naïve benchmark.

4.3 Hypothesis testing and empirical findings– direct effects

At this stage, we tested our hypotheses simultaneously through the bootstrapping procedure; are port of our empirical findings is depicted in Table 7. Overall, our data and analysis support all the direct hypotheses we built. First, we found the relationships between CFP→CEP, CFP→CSP and CSP→CEP to be significant, with beta (β) values of 0.387, 0.665 and 0.236, respectively, and significance at $p = < 0.01$ at 95% CI. Hence, our empirical findings support H1, H2a and H2b. Additionally, we found the relationships between CFP→EMA and EMA→CEP to be fully supported. Specifically, we found beta (β) values of 0.509 and 0.362, respectively, with significance at $p = < 0.01$ at 95% CI. Hence, our empirical findings support H3a and H3b.

***** PLEASE INSERT TABLE 7 HERE *****

4.4 Hypothesis Testing and Empirical Findings– Indirect Effects

In addition to testing the direct effects, we also tested the indirect effects to show the role of mediating variables in the relationship between CFP and CEP. Following the guidelines provided by Hayes (2018) and Cepeda et al. (2017), we used two main steps to assess the specific indirect effects for multiple mediation analysis, namely determining the significance of indirect effects and their magnitude and determining the type of effect and/or mediation (Cepeda et al. 2017). First, we tested the simple cause-effect relationship model (i.e., the model without the mediation variables). Second, we tested the general mediation model (i.e., the model including the mediation variables), evaluated the level of significance

and compared the R^2 value of the two models. The results of the indirect effects are depicted in Table 8.

***** PLEASE INSERT TABLE 8 HERE *****

In Table 8, we find the expected results, with CSP and EMA acting as mediators in the relationship between CFP and CEP. In particular, we found that the relationships between $CFP \rightarrow CSP \rightarrow CEP$ and $CFP \rightarrow EMA \rightarrow CEP$ were significant, with beta (β) values of 0.157 and 0.182, respectively, and significance at $p = < 0.05$ at 95% CI. Given that all the paths we found were significant and positive, this can also be called complementary partial mediation. Hence, our empirical findings support H4a and H4b. Finally, we calculated variance accounted for (VAF) and the difference of R^2 to assess the magnitude of the role of each mediating variable (see Table 8). We found the difference in R^2 between the model without mediation and the model with mediation ranged from $0.063-0.122 > 0.05$, with VAF values of $0.224-0.235 < 0.08$, which can be considered moderately substantial for mediation analysis (Hayes 2018; Cepeda et al. 2017).

4.5 Robustness Tests

We ran a series of complementary tests to ensure the robustness of our main results (Latan 2018; Sarstedt et al. 2020). We tested for endogeneity bias, unobserved heterogeneity and the potential of non-linear effects between variables. We tested endogeneity bias to assess the effect of omitted variables, reverse causality and other potential errors (e.g., sample-selection bias). Heckman's test was conducted using a two-step procedure. Our results, presented in Table 9, indicate that there is no endogeneity bias present in our data or models.

***** PLEASE INSERT TABLE 9 HERE *****

Furthermore, we examined non-linear relationships between variables (Pierce and Aguinis 2013), which have recently attracted the attention of scholars (Latan et al. 2018b; Trumpp and Guenther 2017), to fulfill the linearity assumptions of our model. We ran the Ramsey's regression specification error test (RESET) and quadratic functions in SmartPLS. As depicted in Table 10, Ramsey's RESET test gave results of $p > 0.05$, which supports the assumption of linearity for our model.

***** PLEASE INSERT TABLE 10 HERE *****

Finally, we assessed unobserved heterogeneity to strengthen the robustness of our results. This bias usually occurs when performing sample selection. We used Finite Mixture PLS (FIMIX-PLS) to test this bias. After performing multi-method procedures (Sarstedt et al. 2017), we found that FIMIX-PLS gave a final result of $k = 1$, which means that our data is free from this bias.

5. Discussion and Implications for Theory and Practice

The TBL approach has been discussed among scholars in various fields, and has been recognized as a way for firms to achieve competitive advantage (Lamberton 2005; Sénéchal 2017). As the relationship between the elements of TBL is one of the controversies that is constantly debated in the sustainability literature, a research call that examines the relationship between TBL elements in a single comprehensive model is necessary (Svensson et al. 2016). Our study bridges this gap by testing the relationships between elements of TBL while considering EMA as mediation, and provides new empirical evidence for the Indonesian context. Our main findings can be summarized as follows.

First, we found a direct relationship between TBL elements– CFP and CEP, CFP and CSP, and CSP and CEP (Brammer et al. 2006; Lankoski 2008; Svensson et al. 2016). That is, the higher the CFP of a firm, the more likely it is to pursue sustainable performance – in this case CSP and CEP – by adopting environmentally friendly technologies, making R&D related to the environment, creating social programs, and so on. Our findings corroborate the evidence reported separately by several previous studies related to the TBL model (Garcia-Castro et al. 2010; Svensson et al. 2018; Testa and D’Amato 2017; Van der Laan et al. 2008). In addition, our findings are in line with propositions and strategies formulated in the theories of NRBV and SRBV.

Second, we found evidence of the important role of EMA and CSP in mediating the relationship between CFP and CEP. In addition, we also found a direct relationship between CFP and EMA, and between EMA and CEP. Our test results indicate that both EMA and CSP act as partial mediators. We argue that EMA helps companies by providing information that is useful for managers’ decision-making – concerning both monetary and non-monetary information. Therefore, EMA acts as an intermediary in the CFP and CEP relationship. On the other hand, CSP is expected to mediate the relationship between CFP and

CEP, because by increasing CSP, it will indirectly affect CEP. This result supports the findings of previous studies that have identified the roles of EMA and CSP in mediating the relationship between CFP and CEP (Burritt et al. 2019; Ferreira et al. 2010; Solovida and Latan 2017; Svensson et al. 2018).

Our research provides theoretical and practical implications as follows. In terms of theoretical implications, our findings add new evidence to the sustainable literature, mainly because this is one of the first studies to examine the elements of TBL in a single comprehensive model and also considering EMA as a mediator. In addition, our findings reconcile mixed results that have previously been tested separately on the relationships between TBL elements, and show the role of the third variable that works to mediate these relationships (Dixon-Fowler et al. 2013; Grewatsch and Kleindienst 2017; Albertini 2013). While previous works have found inconclusive results among TBL elements (Fujii et al. 2013; Latan et al. 2018b; Trumpp and Guenther 2017), our results indicate that EMA can help firms provide information that is useful for decision-making related to achieving shared TBL value creation. Finally, our research provides new insights into the progress of the SRBV theory (Tate and Bals 2018), where the missing element in the TBL approach can be found. In this context, CSP is considered to support the achievement of sustainable performance.

In terms of practical implications, our findings offer the following contributions. It is worthwhile to invest in corporate sustainability, because it is feasible to simultaneously achieve economic, environmental, and social performance, since such elements are in fact integrated. In addition, the possession of EMA management tools is necessary to enhance the relationships between CFP and CEP. Furthermore, CSP seems to be an important bond between CFP and CEP, meaning that the social element of TBL is necessary to achieve a truly competitive performance.

6. Limitations and Future Research Directions

A number of limitations of this may be noted as follows. First, the sample size used in this study is relatively small and only comes from one time period. Furthermore, many respondents still consider information about CFP, CSP and CEP to be confidential to their firm. In addition, a one-year time period for data collection may not be enough to claim causality between variables (Henri et al. 2017). Second, our main findings may not be generalizable to other countries. Svensson et al. (2018) indicate that there may be differences in terms of the TBL model between G20 and non-G20 countries. Finally, we only support the role of the third variable as an indirect effect on the relationships between TBL elements.

Recently, there has been a research call to examine the relationships between TBL elements by considering the role of moderating variables (Dixon-Fowler et al. 2013; Grewatsch and Kleindienst 2017).

We suggest the following directions for future research. First, future studies might consider the role of moderating variables in influencing the relationships between TBL elements. For example, the effects of firm characteristics (Grewatsch and Kleindienst 2017) may provide new insights into the TBL literature. In addition, considering the role of antecedent variables in supporting the relationships between TBL elements, such as board environmental committees (Dixon-Fowler et al. 2017), is an area which may prove fruitful for further investigation. Furthermore, future studies may consider using longitudinal data, which is important in order to see changes in TBL elements from year to year. We argue that studies like this are important, but are rarely conducted. Finally, we encourage future research using a mixed methods approach to investigate the relationships between TBL elements. Based on our best knowledge, no previous study has used this approach in investigating the TBL model (Orlitzky et al. 2017).

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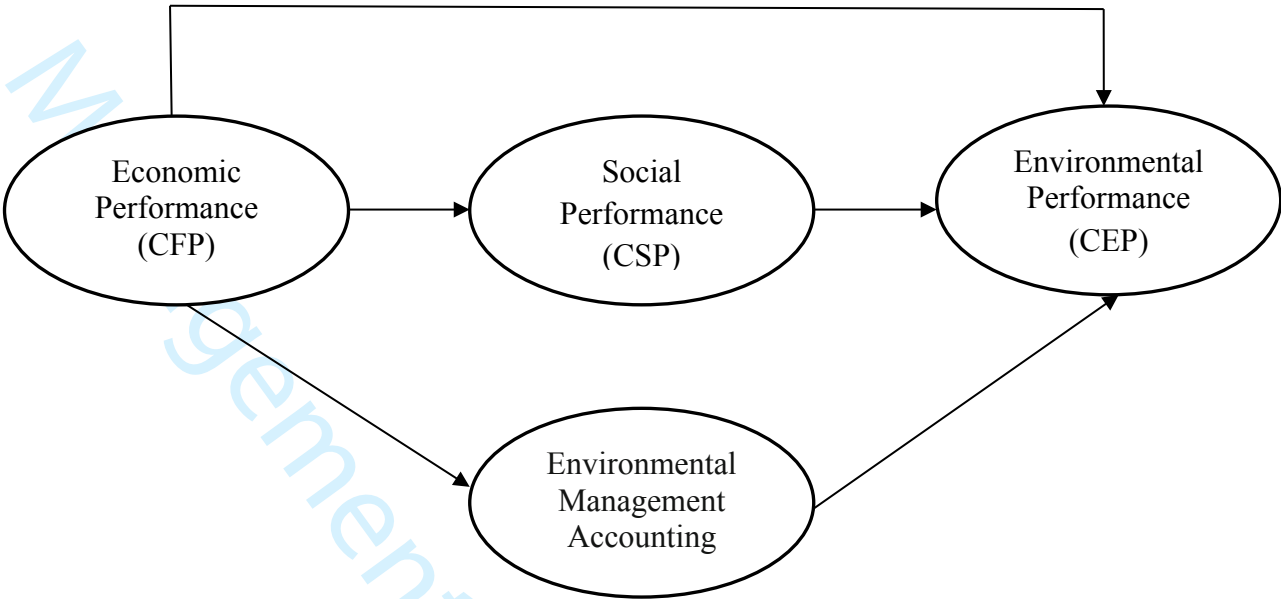


Fig 1. Theoretical framework to understand the relationships between variables

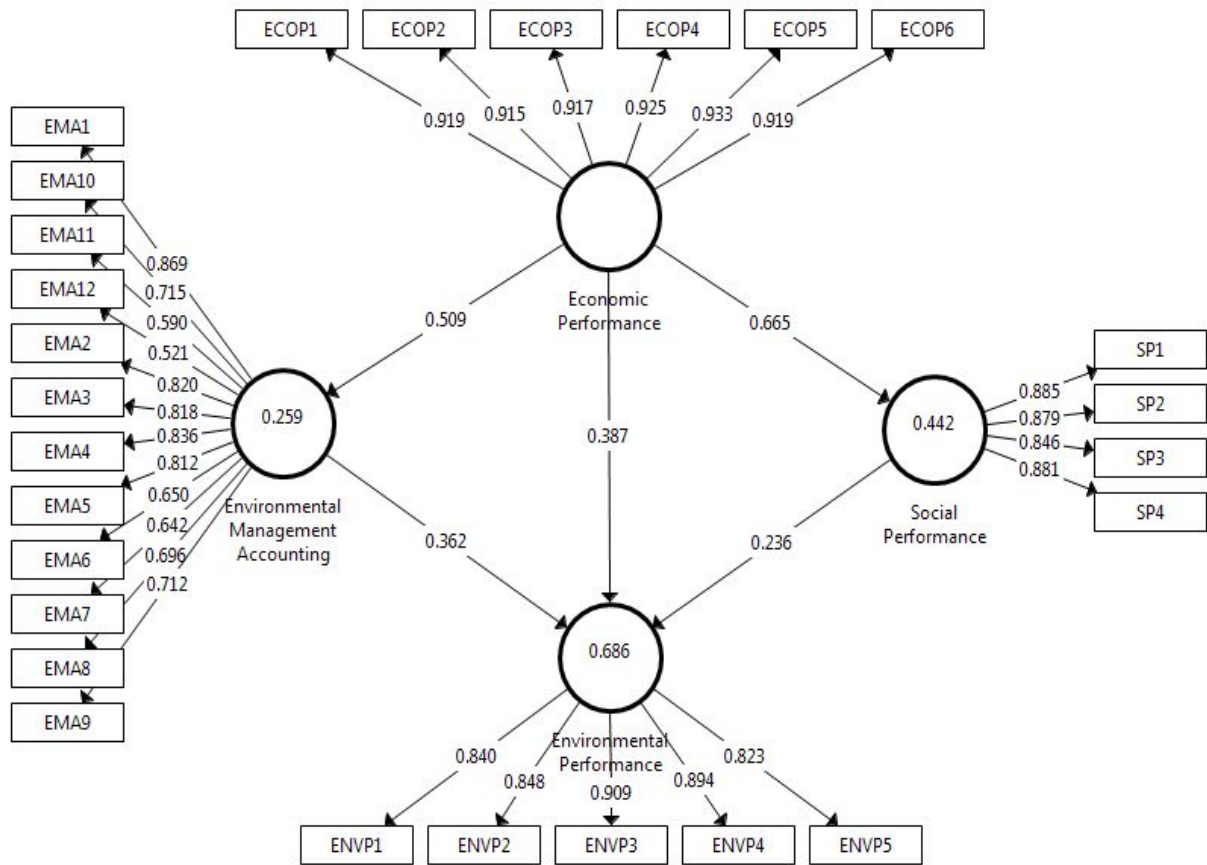


Fig 2. Evaluation of the measurement and structural models

Table 1
Assessment of Non-Response Bias

Constructs	Sig. Levene's Test	Sig. t-test for Equality of Means
Economic Performance (CFP)	0.102	0.447
Social Performance (CSP)	0.533	0.611
Environmental Management Accounting (EMA)	0.086	0.504
Environmental Performance (CEP)	0.063	0.995

Table 2
Profile of Firms

Category	Frequency	Percentage (%)
Employees		
<250	8	9.20
250 – 500	12	13.79
501 – 1000	17	19.54
1001 – 2500	36	41.38
2501 – 5000	9	10.34
>5000	5	5.74
Sales Volume		
< 50billion IDR	9	10.34
51 – 70billion IDR	15	17.24
71 – 100 billion IDR	23	26.44
101 – 200 billion IDR	28	32.18
> 200 billion IDR	12	13.79
Industry		
Food and beverages	26	29.89
Textile	7	8.04
Paper	6	6.90
Chemical	12	13.79
Metal products	16	18.39
Automotive	3	3.45
Machinery and equipment	8	9.19
Oil and gas	14	16.09
Other manufacturing	5	5.75

Table 3

Measurement Model Assessment of Economic, Social and Environmental Performance

Indicators/Items	Code	Mean	S.D	FL ^a	AVE	α	ρ_A
A). Economic Performance (CFP)					0.849	0.964	0.966
Improved cost efficiency	ECOP1	5.736	1.045	0.919			
Created a competitive advantage for the company	ECOP2	5.759	0.970	0.915			
Enhanced the company's image in the market	ECOP3	5.690	1.043	0.917			
Contributed positively to other aspects of the company's business operations	ECOP4	5.678	1.045	0.925			
Improved operational finances	ECOP5	5.770	0.979	0.933			
Generated financial benefits for the company	ECOP6	5.678	1.119	0.919			
B). Social Performance (CSP)					0.762	0.896	0.897
Positively impacted 'word-of-mouth' about the company	SP1	5.839	1.123	0.885			
Appreciated by all stakeholders	SP2	5.667	1.002	0.879			
Considered the social well-being of society as a whole	SP3	5.644	0.934	0.846			
Focused on social (i.e. relational or societal) aspects	SP4	5.586	0.941	0.881			
C). Environmental Performance (CEP)					0.745	0.914	0.917
Focused on environmental issues	ENVP1	5.724	0.854	0.840			
Diminished the corporate impact on the natural environment	ENVP2	5.529	0.856	0.848			
Considered the effects of corporate business operations on global warming	ENVP3	5.897	0.983	0.909			
Highlighted each product's footprint on the natural environment	ENVP4	5.920	1.008	0.894			
Addressed activities related to the environmental impact of products	ENVP5	5.724	0.979	0.823			

Note: ^aFL is factor loading; S.D. is standard deviation; AVE = Average variance extracted; α = Cronbach's Alpha; ρ_A = Dijkstra-Henseler's rho_A.

Table 4

Measurement Model Assessment of Environmental Management Accounting

Indicators/Items	Code	Mean	S.D	FL ^a	AVE	α	ρ_A
A). Environmental Management Accounting(EMA)					0.534	0.920	0.935
Identification of environment-related costs	EMA1	5.655	1.112	0.869			
Estimation of environment-related contingent liabilities	EMA2	5.540	1.112	0.820			
Classification of environment-related costs	EMA3	5.632	1.095	0.818			
Allocation of environment-related costs to production processes	EMA4	5.678	1.088	0.836			
Allocation of environment-related costs to products	EMA5	5.632	1.052	0.812			
Introduction or improvement of environment-related cost management	EMA6	5.425	0.853	0.650			
Creation and use of environment-related cost accounts	EMA7	5.391	0.987	0.642			
Development and use of environment-related key performance indicators (KPIs)	EMA8	5.322	0.903	0.696			
Product life-cycle cost assessments	EMA9	5.276	0.967	0.712			
Product inventory analyses	EMA10	5.322	0.977	0.715			
Product impact analyses	EMA11	5.310	0.986	0.590			
Product improvement analysis	EMA12	5.299	0.924	0.521			

Note:^aFL is factor loading; S.D. is standard deviation; AVE = Average variance extracted; α = Cronbach's Alpha; ρ_A = Dijkstra-Henseler's rho_A.

Table 5

Assessment of Discriminant Validity using the HTMT Test

Construct	1	2	3	4
CFP	(0.900)			
EMA	0.499[0.344;657]	(0.900)		
CEP	0.774[0.664;816]	0.714[0.599;811]	(0.900)	
CSP	0.711[0.568;829]	0.535[0.382;679]	0.744[0.603;818]	(0.900)

Note: brackets show the lower and upper bounds of the 95% BCa confidence intervals.

Table 6

Structural Model Assessment

Construct	R ²	Adj. R ²	f ²	Q ²	VIF	AFVIF
Economic Performance (CFP)	–	–	0.246 – 0.792	–	1.940	2.393
Social Performance (CSP)	0.442	0.436	0.290	0.314	1.909	2.082
Environmental Management Accounting (EMA)	0.259	0.251	0.093	0.118	1.438	1.749
Environmental Performance (CEP)	0.686	0.674	–	0.471	–	3.100

Table 7

Testing of Hypotheses (Direct Effect)

Structural path	Coef(β)	S.D.	p value	95% BCa CI	Conclusion
CFP → CEP	0.387	0.100	0.000**	(0.559, 0.005)**	H1 supported
CFP → CSP	0.665	0.073	0.000**	(0.763, 0.001)**	H2a supported
CSP → CEP	0.236	0.098	0.009**	(0.400, 0.005)**	H2b supported
CFP → EMA	0.509	0.089	0.000**	(0.637, 0.009)**	H3a supported
EMA → CEP	0.362	0.082	0.000**	(0.493, 0.001)**	H3bsupported

Note: **, *statistically significant at the 1 percent and 5 percent levels, respectively.

Table 8.

Testing of Hypotheses (Indirect Effect)

Structural path	Coef (β)	S.D.	p value	95% BCa CI	Conclusion
CFP → CSP → CEP	0.157	0.072	0.015*	(0.289, 0.005)**	H4a supported
CFP → EMA → CEP	0.184	0.046	0.000**	(0.269, 0.000)**	H4b supported
Direct effect	Coef (β)	R ²	a × b / a × b + c	VAF	Conclusion
c	0.731	0.534	–	–	
a ₁	0.510	–	0.211 / 0.942	22.40%	Partial mediation
b ₁	0.413	0.656	–	–	
a ₂	0.666	–	0.225 / 0.956	23.53%	Partial mediation
b ₂	0.338	0.597	–	–	

Note: **, *statistically significant at the 1 percent and 5 percent levels, respectively; *c* is simple cause-effect, *a* and *b* are general mediation model.

Table 9.**Assessment of Endogeneity Bias using the Heckman Test**

Test	Coef (β)	<i>p</i> value	<i>z</i>	Conclusion
CFP → CEP (Selection DV = CSP; IV = EMA)	0.514	0.000**	9.85**	Not occurred
CFP → CSP (Selection DV = CEP; IV = EMA)	0.406	0.000**	8.29**	Not occurred
CSP → CEP (Selection DV = EMA; IV = CFP)	0.775	0.000**	8.43**	Not occurred
CFP → EMA (Selection DV = CEP; IV = CSP)	0.745	0.000**	5.12**	Not occurred
EMA → CEP (Selection DV = CSP; IV = CFP)	0.303	0.000**	8.23**	Not occurred

Note: DV is dependent variables, IV is independent variables **, *statistically significant at the 1 percent and 5 percent levels, respectively.

Table 10.**Assessment of Nonlinear Effects**

Structural path	Coef (β)	<i>p</i> value	f^2	Ramsey's RESET
CFP*CFP → CSP	-0.173	0.073	0.042	
CFP*CFP → CEP	0.192	0.092	0.034	$F(2.261) = 0.42, p = 0.313$
CFP*CFP → EMA	0.286	0.100	0.089	
CSP*CSP → CEP	-0.123	0.066	0.047	$F(1.864) = 0.78, p = 0.695$
EMA*EMA → CEP	0.147	0.109	0.015	

Note: **, *statistically significant at the 1 percent and 5 percent levels, respectively.



Achieving Triple Bottom Line Performance: Highlighting the Role of Social Capabilities and Environmental Management Accounting

Journal:	<i>Management of Environmental Quality</i>
Manuscript ID	MEQ-09-2020-0202.R2
Manuscript Type:	Research Paper
Keywords:	Corporate Sustainability, Triple Bottom Line, Environmental Management Accounting, Corporate Environmental Performance, ISO 14001

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Manuscripts

MEQ-09-2020-0202.R1 (Minor Revision)

Dear Respected Editor, Professor Malin Song
Management of Environmental Quality: An International Journal

Dear Reviewer 1
Dear Reviewer 2

Subject: Submission of revised MEQ-09-2020-0202.R1

First of all, the authors of this submission hope that you are well, safe and healthy during this challenging time.

We are excited to have been given the opportunity to further improve our manuscript and to have this manuscript published in the MEQ. Thank you very much indeed for handling this submission!

We wish to extend our appreciation to Reviewer 1 and 2 for taking the time and effort necessary to provide such insightful guidance. We understand that peer reviewers are working in good faith and provide a crucial service for the advancement of knowledge and discovery worldwide. We would like to also thank you – the Editor – for providing guidance on our research.

We have carefully incorporated the minor comments given into this new version of our manuscript. Please kindly consider the improved version of the paper included here, following these minor comments. Changes are highlighted in **GREEN** colour (see the ‘tracked changes version’ attached) and also in the following response to Reviewer 1 and 2.

In the following section, we offer detailed responses to the previous minor comments given.

Yours sincerely,

The author(s)

Table of Actions – MEQ R2

Reviewer 1's Comments	Authors' Comments
All the suggestions were assessed. I think it only needs a section to explain all acronyms used.	Dear Reviewer 1, We would like to thank you very much for carefully reading the revised version of our manuscript and for providing generous comments on the R1 version. We have amended the manuscript to incorporate your minor comments. Many thanks and all the best! Regarding the acronyms contained in this paper, we have followed the MEQ author's guidelines below: - All acronyms should be fully stated at the beginning. For example: We use the acronym - TBL. We fully state this acronym at the beginning of the sentence. Page 2 – First paragraph “In particular, the concept of the ‘triple bottom line’ (TBL) has become an established theoretical blueprint (Elkington, 1998). The concepts involved in the TBL focus firms not just on the economic value that they add, but also on the environmental and social value that they add (Elkington, 2004). This framework has been widely adopted and has led to transformation among firms in engaging with sustainable investment (Dos Santos et al., 2014; Høgevold et al., 2019).” and also, for CFP, CEP and CSR. Page 2 – Second paragraph

	“For example, most research has devoted its attention to the relationship between corporate financial performance (CFP) and corporate environmental performance (CEP) (Albertini, 2013; Latan et al., 2018b; Trumpp and Guenther, 2017; Wagner, 2015), providing mixed results. Such research ignores social performance as the third element of TBL (Cegarra-Navarro et al., 2016; Epstein et al., 2015; Ullmann, 1985). On the other hand, some studies have also focused on the relationship between corporate social responsibility (CSR) and financial performance, without achieving conclusive results (Brammer and Millington, 2008; Beurden and Gossling, 2008; Orlitzky et al., 2003; Waddock and Graves, 1997).” Additionally, we’ve counted the total acronyms in our paper and found it to be no more than eight. This number is very small. Therefore, we decided not to create a section to explain these acronyms, but we followed the guidelines for writing acronyms that are common to all journals by declaring them in front of the sentence. We are sure that readers and scholars are familiar with this style. Also, this is in line with the style of acronyms in the articles published in MEQ.
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Reviewer 2’s Comments	Authors’ Comments
The author(s) have adequately responded to comments and recommendations suggested by the reviewers. The manuscript can be processed further after they perform a thorough proofread (e.g. the term is CSR, not CRS) and make sure that all in-text citations appear in the reference list in the end with consistency and in line with the Journal's Guidelines to Authors.	Dear Reviewer 2, We would like to thank you very much for carefully reading the revised version of our manuscript and for providing generous comments on the R1 version. We have amended the manuscript to incorporate your minor comments. Many thanks and all the best! We’ve worked with a native English speaker to read this paper one more time. The current version has been improved and we’ve made sure

everything is OK. Regarding CSR, yes this is a typo. Thank you for your thoroughness. We've fixed it below.

Page 17 – First paragraph

“Furthermore, CSP seems to be an important bond between CFP and CEP, meaning that the social element of TBL is necessary to achieve a truly competitive performance. A focus on social activities such as CSR (Skouloudis et al., 2015) might also add value to the economic and environmental aspects of the firm.”

Additionally, we would like to inform Reviewer 2 that we already working with the Endnote software. Therefore, all citations and reference list ‘match’. We’ve also used the Harvard Emerald citation style according to the author’s guidelines.

Achieving Triple Bottom Line Performance: Highlighting the Role of Social Capabilities and Environmental Management Accounting

Abstract

Purpose – The relationship between the elements of the Triple Bottom Line (TBL) is a controversial area that is constantly debated in the sustainability literature. Our study addresses this debate by testing the relationships between these elements, while considering Environmental Management Accounting (EMA) as a mediating influence.

Design/methodology/approach – This paper examines survey responses from upper-level managers (i.e., general managers, operations managers, financial managers and environmental managers) from ISO 14001-certified manufacturing companies listed on the Indonesian Stock Exchange. The hypotheses were tested using a partial least squares approach and bias-corrected and accelerated bootstrap confidence intervals to test the significance of the relationships between variables.

Findings – We found a direct relationship between the TBL elements and the role of EMA and social performance in mediating the relationship between economic performance and environmental performance.

Research limitations/implications – Our research also provides new insights into the progress of the Social Resource Based View theory, where the social element missing from the TBL approach can be found.

Practical implications – The findings of this article imply that it is worthwhile to invest in corporate sustainability, because it is thereby possible to simultaneously achieve economic, environmental and social performance, since such elements are truly integrated. In addition, possession of EMA management tools is necessary to enhance the relationships between economic performance and environmental performance. Furthermore, social performance seems to constitute an important bond between both of these, indicating that the social element of the TBL is necessary to achieve truly competitive performance.

Originality/value – This study contributes to the corporate environmental management literature by providing empirical evidence regarding the TBL elements.

Keywords Corporate Sustainability, Triple Bottom Line, Environmental Management Accounting, Corporate Environmental Performance and ISO 14001.

Paper type Research paper

1. Introduction

In the past decade, research topics within the fields of sustainability, cleaner production and environmental issues have been discussed extensively among scholars in various disciplines (Chiappetta Jabbour *et al.*, 2010; Høgevold *et al.*, 2019; Laurell *et al.*, 2019; Nicoletti Jr *et al.*, 2018; Orlitzky *et al.*, 2017; Sénéchal, 2017; Solovida and Latan, 2017; Wang and Sarkis, 2017). In particular, the concept of the ‘triple bottom line’ (TBL) has become an established theoretical blueprint (Elkington, 1998). The concepts involved in the TBL focus firms not just on the economic value that they add, but also on the environmental and social value that they add (Elkington, 2004). This framework has been widely adopted and has led to transformation among firms in engaging with sustainable investment (Dos Santos *et al.*, 2014; Høgevold *et al.*, 2019). However, to date, little is known about the relationships between the elements which make up the TBL, and there is a lack of empirical studies addressing this topic as a whole (Gimenez *et al.*, 2012; Svensson *et al.*, 2018).

Specifically, rather than thoroughly analyzing the relationships between the TBL elements, previous studies have predominantly tested the elements of TBL separately. For example, most research has devoted its attention to the relationship between corporate financial performance (CFP) and corporate environmental performance (CEP) (Albertini, 2013; Latan *et al.*, 2018b; Trumpp and Guenther, 2017; Wagner, 2015), providing mixed results. Such research ignores social performance as the third element of TBL (Cegarra-Navarro *et al.*, 2016; Epstein *et al.*, 2015; Ullmann, 1985). On the other hand, some studies have also focused on the relationship between corporate social responsibility (CSR) and financial performance, without achieving conclusive results (Brammer and Millington, 2008; Beurden and Gossling, 2008; Orlitzky *et al.*, 2003; Waddock and Graves, 1997). Meanwhile, TBL assumes that its three pillars – economic, environmental and social – are interconnected and must be integrated in order to achieve competitive advantage (Elkington, 2004). Because there is no general consensus on the relationships between the elements of TBL, and because there is a lack of studies that provide concrete evidence on TBL, there is an urgent demand to re-examine these relationships in a single model (Svensson *et al.*, 2016; Laurell *et al.*, 2019).

This article aims to fill this persistent gap by testing the elements of TBL in a single model using ISO 14001-certified manufacturing companies listed on the Indonesian Stock Exchange (IDX). In addition, we also analyse environmental management accounting (EMA) as a mediator in the relationships between TBL elements (Burritt *et al.*, 2009; Christ *et al.*, 2016; Jasch, 2006). We argue that EMA plays an important role in bridging the

relationships between TBL elements, by providing information that is useful to managers' decision making.

EMA can be understood as a set of management tools that allows companies to improve their CFP, CEP and CSP by providing monetary information, such as costs and revenue, as well as non-monetary information such as energy, water and material usage or carbon dioxide emissions (Jasch, 2006; Christ and Burritt, 2013). Several previous studies have indicated that EMA is a useful instrument for improving CEP (Ferreira *et al.*, 2010; Solovida and Latan, 2017) in relation to providing information for companies (Burritt and Saka, 2006; Burritt *et al.*, 2019; Chiappetta Jabbour *et al.*, 2013).

We tested our model and collected data in Indonesia, a country with one of the largest levels of economic growth in the world, and part of the G20. Indonesia is predicted to become the fourth strongest economy in the world in 2045, according to research conducted by PricewaterhouseCoopers (PwC) in 2017. In addition, Indonesia offers an interesting phenomenon in terms of the TBL model, with previous studies reporting a lack of CEP in firms operating in Indonesia (Burritt *et al.*, 2019; Latan *et al.*, 2018a). According to the United Nations Environment Program (UNEP) report in 2018, Asia-Pacific is the fastest-growing region in the world. This economic boom has lifted many out of poverty, but it has also caused significant environmental degradation, with negative effects on human wellbeing. Because of these important issues in Indonesia, research specific to the Indonesian context has become an urgent demand.

Our study extends the state-of-the-art research in the field of sustainability and environmental management and provides original evidence in three ways. First, we answer the research call from Svensson *et al.* (2016) to test the elements of TBL in a single comprehensive model. Our study is the first to address these gaps by providing original evidence on the relationships between TBL elements in a single comprehensive model in the Indonesian context – a country that is part of the G20. Second, we reconcile the mixed results found in previous studies regarding TBL elements. Our research provides new insights into the development of the Social Resource Based View (SRBV) theory (Tate and Bals, 2018), which includes the social element missing from the TBL approach. While a plethora of emerging research studies has dealt separately with the relationships between CFP and CEP, as well as CSR and CFP, their results remain at times unclear and contradictory (Beurden and Gossling, 2008; Dixon-Fowler *et al.*, 2013; Orlitzky *et al.*, 2003). For example, inconclusive results have been presented regarding the relationship between CFP and CEP. More

specifically, five separate research streams have been produced, in which the relationship between CFP and CEP has variously been found to have either a positive, neutral or negative effect and to be either U-shaped or inverted U-shaped (Fujii *et al.*, 2013; Latan *et al.*, 2018b; Trumpp and Guenther, 2017). Our study re-examines the relationships between TBL elements by considering the role of EMA as a mediating factor. Jasch (2006) argues that EMA is a useful tool for providing information to improve CEP. Based on our best knowledge, our research is the first to test the TBL model while also considering the role of EMA. Therefore, we add new empirical evidence to the sustainability and environmental management literature.

Finally, our research contributes fresh empirical evidence in the context of developing countries – in this case, Indonesia. Although a small number of studies related to TBL and EMA have been conducted in the Asia-Pacific region, including Australia, China, Japan, Philippines and Thailand (Burritt *et al.*, 2019; Burritt and Saka, 2006; Kuasirikun, 2005; Schaltegger *et al.*, 2008), most of this research has been carried out through case studies. Although qualitative studies have indicated that the elements of TBL are interrelated with one another in decision making for business sustainability, it is important to examine the relationships between these elements empirically. Hence, our study contributes by testing the relationships between the TBL elements in the Indonesian context both empirically and simultaneously.

The remainder of this paper is organized as follows. The next section presents the theoretical background and development of hypotheses, followed by the research methodology. Subsequently, we present our empirical results. Finally, we discuss these results and provide implications that may be useful for both academics and practitioners.

2. Theoretical Background and Development of Hypotheses

2.1. The natural resource-based view (NRBV) and sustainability

One of the main sustainability theories supporting the relationship between CFP and CEP is the natural resource-based view (NRBV) (Hart, 1995; Hart and Dowell, 2011). The NRBV is an extension of the resource-based view (RBV), which focuses not only on CFP, but also on sustainable development, including CEP. The basic assumption of the RBV is that the basis of competitive advantage lies in the application of each firm's unique combination of valuable resources and capabilities to improve efficiency and business performance (Barney, 1991; Newbert, 2007). This implies that only firms that can use

resources effectively and have the ability to innovate will gain competitive advantage and, therefore, achieve superior performance. Sustainable competitive advantage is determined based on the firm's ability to reconfigure its valuable and idiosyncratic resources. According to the RBV, these resources should be inimitable, rare and non-tradable (Barney, 1991; Hart, 1995; Russo and Fouts, 1997).

Hart and Dowell (2011) evaluated fifteen years of the development of the RBV, based on various empirical results concerning the propositions of the RBV, and thus formulated the NRBV. These authors argue that the RBV does not consider CEP, while environmental and sustainability issues have in recently years become widely discussed topics. Therefore, the RBV was revisited. Building on the logic of the RBV, the NRBV describes how firms can achieve competitive advantage by means of cost efficiency relating to environmental issues and minimizing environmental impact across the entire value chain of the firm. Specifically, the NRBV consists of three interrelated strategies: (1) pollution prevention, which focuses on minimizing waste, emissions and effluents with the aim of increasing efficiency and reducing costs; 2) product stewardship, which focuses on minimizing the entire value chain costs of products and thus expands the scope of pollution prevention; and (3) sustainable development, which focuses on sustainable growth of the firm while reducing environmental damage. Hence, the NRBV strategy emphasizes not only financial growth, but also environmental aspects (Hart and Dowell, 2011).

However, neither RBV nor NRBV take into account the social dimension of TBL, creating a persistent gap in the sustainability literature. As a result, a large number of studies use the term 'sustainability' but, in fact, only investigate CFP and CEP. Driven by this gap, Tate and Bals (2018) propose incorporating the social element of TBL as a complement to the propositions expressed in RBV and NRBV. Thereby, the social resource-based view (SRBV) is created, to show how social capabilities can be used to achieve competitive advantage. Tate and Bals (2018) suggest that the three elements of TBL – CFP, CEP and CSP – must be connected in order to achieve shared TBL value creation.

2.2. The social resource-based view (SRBV) and sustainability

Recently, Tate and Bals (2018) have proposed the social resource-based view (SRBV), which emphasizes the role of social capabilities in the achievement of competitive advantage. They argue that social performance has received too little attention in the context of business performance and sustainability. According to Tate and Bals (2018), RBV and NRBV do not capture social performance, the third element of the TBL model. This neglect is

due to the RBV focusing on CFP in order to maximize profits, while the NRBV focuses on CEP for the preservation of the natural environment; neither focuses on social capabilities. Therefore, the SRBV complements RBV and NRBV by focusing more on CSP than CFP and CEP. Inspired by RBV and NRBV, SRBV uses two main strategies: 1) a mission-based approach, which focuses on maximizing social benefits while breaking even and becoming profitable in order to perpetuate the business model; and 2) stakeholder management, which focuses on maximizing support in terms of products, information and funds from a broad stakeholder base (Tate and Bals, 2018).

In this paper, we examine the relationships between the elements of the TBL model –CFP, CSP and CEP – while considering EMA as a mediator in these relationships. We test this model simultaneously and explain the relationships between these variables based on our conceptual framework and the results of previous studies, and thus derive our hypotheses. First, we hypothesize regarding the direct effects of the relationships between CFP, CSP and EMA on CEP. Second, we hypothesize regarding the indirect effects between these relationships. Figure 1 presents our theoretical model.

2.3. The relationship between the TBL elements – economic, social and environmental performance

Topics related to social and environmental issues began to be studied around the 1970s, but interest in such issues has grown exponentially in the past decade. Nowadays, firms are not solely focused on short-term performance through reliance on CFP, but also consider sustainable performance, which depends on three dimensions: the social dimension, relating to community welfare; the environmental (or ecological) dimension, which relates to the preservation of the natural environment; and the financial dimension, aimed at cost efficiency and boosting benefits (Svensson *et al.*, 2016; Sénéchal, 2017).

In all three of RBV, NRBV and SRBV, CFP is the first pillar which supports sustainable performance. In this view, the capabilities of the firm in developing and managing a bundle of resources such as technology, design, procurement, production, distribution and service are the main keys to achieving competitive advantage (Barney, 1991; Hart, 1995; Hart and Dowell, 2011; Russo and Fouts, 1997; Tate and Bals, 2018). The goal is to achieve cost differentiation, and to gain a more advantageous position than competitors. A firm that has grown in terms of CFP will in turn pursue sustainability performance by focusing on improving CSP and CEP. By focusing on CSP and CEP, a firm will gain additional benefits and reduce costs across the entire value chain. Hence, an increase in CFP will positively

influence the firm's CSP and CEP. For example, companies can adopt environmentally friendly technologies, conduct R&D to minimize environmental damage and create programs for social responsibility. All of these actions have an impact not only on cost efficiency, but also on reputation, image and organizational learning (Lankoski, 2008; Hart and Dowell, 2011; Tate and Bals, 2018).

Several previous studies have found a positive effect based on the relationships between CFP and CEP (Laurell *et al.*, 2019; Svensson *et al.*, 2018; Testa and D'Amato, 2017), CFP and CSP (Brammer and Millington, 2008; Brammer *et al.*, 2006; Waddock and Graves, 1997; Scholtens, 2008) and CSP and CEP (Orlitzky *et al.*, 2017; Garcia-Castro *et al.*, 2010; Laurell *et al.*, 2019; Svensson *et al.*, 2018). Based on the above discussion, we derive the following hypotheses:

H1: CFP has a positive and direct effect on CEP.

H2a: CFP has a positive and direct effect on CSP.

H2b: CSP has a positive and direct effect on CEP.

2.4. Indirect effects between the TBL elements through EMA

Over the past decade, the study of the relationships among the elements of TBL has had a prominent place in the sustainability literature. However, although hundreds of separate studies have been carried out and reported, inconsistent and disappointing results have provoked recent debate. This is because the relationships between the elements of TBL have continually produced mixed research results. Several meta-analytical studies have revealed that such mixed results found by scholars may be determined further by examining the role of a third variable. For example, Dixon-Fowler *et al.* (2013) and Grewatsch and Kleindienst (2017) suggest introducing mediator or moderator variables into the relationships between these TBL elements. Meanwhile, a study conducted by Svensson *et al.* (2018) shows that the role of the third variable works well in analyzing the relationships between TBL elements. Specifically, Svensson *et al.* (2018) found that CSP mediated the relationship between CFP and CEP.

Based on the logic of NRBV and SRBV (Hart and Dowell, 2011; Tate and Bals, 2018), firms that achieve superior performance are not only able to manage CFP, but also CSP and CEP. In this situation, a firm that has excelled in CFP can directly increase its CEP by adopting environmentally friendly technologies, adopting various quality standards and developing programs related to the environment etc. for cost efficiency (Lankoski, 2008). Conversely, a firm that focuses on increasing CSP will ultimately indirectly increase its CEP

as well (Garcia-Castro *et al.*, 2010; Orlitzky *et al.*, 2017; Svensson *et al.*, 2016), given that CSP and CEP are interconnected.

In addition, several scholars have indicated that EMA is an intermediary in the relationships between TBL elements (Ferreira *et al.*, 2010; Christ and Burritt, 2013; Solovida and Latan, 2017). A firm that is successful in managing CEP requires a set of tools that can provide information for decision-making. EMA offers this information, providing information related not only to monetary factors such as costs and revenue, but also non-monetary information concerning energy, water, materials or carbon dioxide emissions. Previous research conducted by Burritt *et al.* (2019), Ferreira *et al.* (2010) and Solovida and Latan (2017) indicates that EMA can mediate the relationship between CFP and CEP. Based on the above discussion, we derive the following hypotheses:

H3a: CFP has a positive and direct effect on EMA.

H3b: EMA has a positive and direct effect on CEP.

H4a: CFP has a positive and indirect effect on CEP through CSP.

H4b: CFP has a positive and indirect effect on CEP through EMA.

Figure 1 portrays the research framework empirically tested in this work.

*****PLEASE INSERT FIGURE 1 HERE*****

3. Research Method

3.1. Sample and data collection

The sample in this study is composed of upper-level managers (i.e., general managers, operations managers, financial managers and environmental managers) from ISO 14001-certified manufacturing companies listed on the Indonesian Stock Exchange (IDX). ISO 14001 is an international standard awarded to companies that have adopted environmentally friendly processes and products. Our sampling frame was determined based on data provided by IDX (www.idx.co.id) and the Indonesian Ministry of Environment and Forestry. According to this database, in 2018 there were a total of 285 companies with ISO 14001 certification operating in Indonesia. We contacted all of these companies to ask them to participate in our survey, and received approval from 109 companies.

After receiving approval, we conducted pre-testing to minimize potential bias and ensure the appropriate operation of the questionnaire before it was sent to the target respondents (Fowler Jr, 2013; Groves *et al.*, 2009). We held discussions with four academics

and business professionals to assess the content validity of the questionnaire. The academics consulted were senior researchers in the field of environment and sustainability, with strong reputations in this field, while the business professionals were Chief Executive Officers (CEO) and consultants. Some improvements were made to the questionnaire in terms of phrasing, clarity and accuracy of the questions in order to be understandable and avoid questions which were vague, ambiguous, or difficult to answer. The final version of this questionnaire was sent to 22 companies for preliminary analysis and we thereby assessed the validity and reliability of the indicators in the model. The results of our preliminary analysis indicated that the items used are valid and reliable for measuring the variables in our model.

We conducted data collection between June and December 2018 using an online survey, as well as contacting each respondent via telephone calls and emails. We chose this method because it is considered effective for reaching a broad range of respondents at low cost (Dillman *et al.*, 2014; Groves *et al.*, 2009). In order to increase the response rate, we sent several reminder e-mails and made several phone calls to non-responders. We also guaranteed the anonymity of responses and did not disclose the identity of the companies involved. Finally, we provided a cut-off date of five months for completion of this survey for the purpose of testing non-response bias (Dillman *et al.*, 2014; Fowler Jr, 2013).

At the time of the deadline, we had received 91 returned questionnaires; four of these were excluded due to incompleteness, giving an overall response rate of 19.95%. We argue that this response is acceptable for studies in sustainability and the environment (Dubey *et al.*, 2017; Wijethilake, 2017), with some studies giving rates lower than this threshold (Christ and Burritt, 2013; Ferreira *et al.*, 2010). However, in order to ensure that there were no biases or differences between respondents and non-respondents in this survey, we tested non-response bias by comparing those who responded early and those who responded late in the survey period (Clotey and Grawe, 2014; Dalecki *et al.*, 1993). We assume for this purpose that late respondents are similar to non-respondents, in terms of time taken to reply. We used a t-test to assess differences in the means of the two sample groups. Our results did not find significant ($p > 0.05$) differences between these groups of respondents (see Table 1). In addition, we compared socio-demographic variables (i.e., gender and age) using a Bonferroni test to maintain the robustness of these results. Our results indicate a similar response rate across subgroups, which indicates that our data is free of non-response bias (Clotey and Grawe, 2014; Groves, 2006). Finally, we tested for common method bias (CMB), which is another potential source of bias when using the survey method (Siemsen *et al.*, 2010). We

used full collinearity VIFs (AFVIF), an approach proposed by Kock (2015) to assess CMB between the item correlations of two constructs. Our analysis results resulted in an AFVIF value of $2.887 < 3.3$, which indicates that CMB does not occur in our measurements. A summary of the profile of participating firms can be seen in Table 2 below.

*****PLEASE INSERT TABLE 1 HERE*****

*****PLEASE INSERT TABLE 2 HERE*****

3.2. Measurement items and scales

In survey-based studies, measurement scales and indicators are crucial elements in order to produce unbiased estimates. We used measurement scales and indicators adopted from previous studies in the field of environment and sustainability in order to avoid scale proliferation. We consider that these indicators have been validated through the test-retest method and are well established. We used multiple indicators rather than a single indicator to measure each construct in the model, in order to capture the essence of the variables with a degree of precision that a single item could not attain (DeVellis, 2017). This method aims to reduce measurement errors and improve the validity and reliability of indicators. We measured CFP, CSP and CEP using indicators adopted from Svensson *et al.* (2016), Svensson *et al.* (2018) and Laurell *et al.* (2019). We used a 7-point Likert scale across a total of 15 items, including 6, 4 and 5 indicators to measure CFP, CSP and CEP, respectively. This scale ranges from 1 = “strongly disagree” to 7 = “strongly agree”. Subsequently, we measured EMA using indicators adopted from Ferreira *et al.* (2010) and Christ and Burritt (2013). We used a 7-point Likert scale with 12 indicators to measure this construct. This scale ranges from 1 = “does not at all” to 7 = “does to a great extent”.

3.3. Data analysis

The structural equation modeling (SEM) method was used to simultaneously test the relationships between unobserved variables in our model. Two SEM approaches – covariance structure analysis (CSA) and partial least squares path modeling (PLS-PM) – are available to analyze our data (Henseler, 2021; Jöreskog *et al.*, 2016). We chose PLS-PM due to some favorable considerations over CSA. First, PLS-PM is a soft modeling approach, which uses non-parametric assumptions. Hence, PLS-PM does not depend on the parametric assumptions of Maximum Likelihood (ML), such as multivariate normality or goodness-of-fit of model. In addition, PLS-PM avoids the problem of Heywood cases in our data. Second,

PLS-PM has a “causal-predictive” nature and aims to predict relationships between variables, rather than testing causality to confirm theories (Hair *et al.*, 2019; Pearl *et al.*, 2016). Here, this approach allows us to strike a balance between explanation and prediction, given that our model has a relative scarcity of theory and knowledge. Finally, PLS-PM allows us to test the specific indirect effects between latent variables and conduct a series of robustness tests (Latan, 2018). In this case, PLS offers advanced features with a user-friendly interface.

In this study, we have followed the current guidelines for reporting PLS-PM analysis, which are well-documented in the literature (Latan, 2018; Benitez *et al.*, 2020). Specifically, the three main steps which we conducted and reported are as follows. First, we assessed and evaluated the results of the measurement model. This is intended to assess the validity and reliability of construct indicators (i.e., convergent validity, discriminant validity and internal consistency reliability). Second, we assessed and evaluated the results of the structural model. This is intended to assess the overall fit of the model (i.e., r-square, effect size and predictive relevance) and test our hypotheses. Finally, we ran several series of robustness tests to ensure that our main results are not biased (i.e., endogeneity testing, unobserved heterogeneity and non-linear effects).

4. Results

We used the SmartPLS 3 software (Ringle *et al.*, 2015) to estimate the parameters of our model using a number of specific settings, as follows. In the PLS-PM algorithm settings, we set the maximum number of iterations at 300 through the path weighting scheme, with a stop criterion of 10^{-7} . In terms of bootstrapping, we used 10,000 subsamples to obtain stability of estimates. We selected confidence interval methods, namely bias-corrected and accelerated (BCa) bootstrapping. In addition, the level of significance we used to reject the null hypothesis was set at 5% (one-tailed). The results of the descriptive statistics for each indicator in the model are depicted in Tables 3 and 4.

4.1. Measurement model evaluation

Before we discuss the empirical findings of our hypothesis testing, it is pertinent to evaluate the measurement model and ensure that the indicators we used are valid and reliable. Drawing on standard evaluation guidelines (Latan, 2018; Benitez *et al.*, 2020), we used several core metrics that are commonly used in PLS to report the assessment of the measurement model, which includes convergent validity, discriminant validity and internal consistency reliability. Based on Tables 3 and 4, we obtained factor loading values for each

indicator of the construct, which met the threshold value of > 0.708 and average variance extracted (AVE) of > 0.50 (Hair *et al.*, 2017; Latan and Noonan, 2017). Only a few construct indicators (i.e., items of EMA) yielded values slightly below this threshold, which is, however, acceptable according to extant guidelines (Hair *et al.*, 2017) to strengthen content validity (see Figure 2). From these results, we conclude that our respondents understand the definition of the concepts being measured and that their answers converge to reflect the true situation. We further assessed internal consistency reliability using Cronbach's alpha (α) and Dijkstra-Henseler's ρ_A tests. The threshold values for Cronbach's alpha (α) and ρ_A are recommended to be > 0.70 . We obtained values above 0.85 for both measures for all constructs in the model (see Table 3 and 4), thus meeting this threshold value.

***** PLEASE INSERT TABLE 3 HERE *****

***** PLEASE INSERT TABLE 4 HERE *****

Finally, we used the heterotrait-monotrait (HTMT) ratio to evaluate discriminant validity in our PLS model, which is considered to outperform other traditional approaches (e.g., Fornell-Larcker criterion). The threshold for HTMT values of > 0.90 indicates conceptually similar constructs, while HTMT values < 0.85 indicate conceptually different constructs (Henseler, 2021; Nunnally and Bernstein, 1994). From Table 5, we can conclude that discriminant validity is fulfilled for our data.

***** PLEASE INSERT TABLE 5 HERE*****

4.2. Structural model evaluation

After evaluating the measurement model, the second step was to assess the structural model. We assessed several core metrics, including coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2) and variance inflation factor (VIF). In addition, we assessed our model's out-of-sample predictive power by conducting the PLS predict procedure (Benitez *et al.*, 2020; Latan, 2018).

*****PLEASE INSERT FIGURE 2 HERE*****

***** PLEASE INSERT TABLE 6 HERE *****

We obtained both R^2 and adj. R^2 values as depicted in Table 6 for CFP, CSP, and CEP, which range from 0.259–0.686. According to Hair *et al.* (2017), these values are included in the weak to moderate category. The predictors in our model produced effect size

(f^2) values ranging from 0.093–0.792 (i.e., included in the small and large categories), which show the respective contributions of variance in the model. We also assessed the predictive relevance of our model (Q^2). Values of Q^2 larger than zero are considered meaningful. Our model produced Q^2 values ranging from 0.118–0.471, depicting small and medium levels of predictive relevance of the PLS model. We obtained VIF values for each predictor in the model of < 3.3 , which indicates no high correlation or collinearity between predictor variables in our cases.

Finally, we assessed the model’s out-of-sample predictive power by conducting the PLS predict procedure to generate holdout sample-based point predictions for the constructs in our model. Because our sample size meets minimum requirements and is in the medium size category, we used ten folds and ten replications, comparing the root mean squared error (RMSE) values from the PLS-PM analysis with those generated by a naive linear benchmark (Hair *et al.*, 2017). The results of our analysis indicate that PLS-PM yields lower prediction errors than the naive benchmark for all the indicators related to CFP, CSP, CEP and EMA, offering clear support for our model’s predictive power. In addition, $Q^2_{predict}$ values > 0 for all indicators suggest that our model outperforms the most naïve benchmark.

4.3 Hypothesis testing and empirical findings – direct effects

At this stage, we tested our hypotheses simultaneously through the bootstrapping procedure; a report of our empirical findings is depicted in Table 7. Overall, our data and analysis support all the direct hypotheses we proposed. First, we found the relationships between CFP→CEP, CFP→CSP and CSP→CEP to be significant, with beta (β) values of 0.387, 0.665 and 0.236, respectively, and significance at $p = < 0.01$ at 95% CI. Hence, our empirical findings support H1, H2a and H2b. Additionally, we found the relationships between CFP→EMA and EMA→CEP to be fully supported. Specifically, we found beta (β) values of 0.509 and 0.362, respectively, with significance at $p = < 0.01$ at 95% CI. Hence, our empirical findings support H3a and H3b.

***** PLEASE INSERT TABLE 7 HERE *****

4.4 Hypothesis testing and empirical findings – indirect effects

In addition to testing the direct effects, we also tested the indirect effects to show the role of mediating variables in the relationship between CFP and CEP. Following the guidelines provided by Hayes (2018), we used two main steps to assess the specific indirect

effects for multiple mediation analysis, namely determining the significance of indirect effects and their magnitude and determining the type of effect and/or mediation (Vanderweele, 2015). First, we tested the simple cause-effect relationship model (i.e., the model without the mediation variables). Second, we tested the general mediation model (i.e., the model including the mediation variables), evaluated the level of significance and compared the R^2 value of the two models. The results of this indirect effect testing are depicted in Table 8.

***** PLEASE INSERT TABLE 8 HERE *****

As shown in Table 8, we found the results to be as expected, with CSP and EMA acting as mediators in the relationship between CFP and CEP. In particular, we found that the relationships between $CFP \rightarrow CSP \rightarrow CEP$ and $CFP \rightarrow EMA \rightarrow CEP$ were significant, with beta (β) values of 0.157 and 0.182, respectively, and significance at $p = < 0.05$ at 95% CI. Given that all the paths we found were significant and positive, this can also be referred to as complementary partial mediation. Hence, our empirical findings support H4a and H4b. Finally, we calculated variance accounted for (VAF) and the difference of R^2 to assess the magnitude of the role of each mediating variable (see Table 8). We found that the difference in R^2 between the model without mediation and the model with mediation ranged from $0.063 - 0.122 > 0.05$, with VAF values of $0.224 - 0.235 < 0.08$, which can be considered moderately substantial for mediation analysis (Hayes, 2018; Vanderweele, 2015).

4.5 Robustness tests

We ran a series of complementary tests to ensure the robustness of our main results (Latan, 2018; Lopes de Sousa Jabbour *et al.*, 2020). We tested for endogeneity bias, unobserved heterogeneity and the potential of non-linear effects between variables. We tested endogeneity bias to assess the effect of omitted variables, reverse causality and other potential errors (e.g., sample-selection bias). Heckman's test was conducted using a two-step procedure. Our results, presented in Table 9, indicate that there is no endogeneity bias present in our data or models.

***** PLEASE INSERT TABLE 9 HERE *****

Furthermore, we also examined non-linear relationships between variables (Pierce and Aguinis, 2013), an area which has recently attracted the attention of scholars (Latan *et al.*, 2018b; Trumpp and Guenther, 2017), in order to fulfill the linearity assumptions of our

model. We ran the Ramsey’s regression specification error test (RESET) and quadratic functions in SmartPLS. As depicted in Table 10, Ramsey’s RESET test gave results of $p > 0.05$, which supports the assumption of linearity for our model.

***** PLEASE INSERT TABLE 10 HERE *****

Finally, we assessed unobserved heterogeneity to strengthen the robustness of our results. This bias usually occurs during sample selection. We used Finite Mixture PLS (FIMIX-PLS) to test this bias. After performing multi-method procedures (Sarstedt *et al.*, 2017), we found that FIMIX-PLS gave a final result of $k = 1$, which indicates that our data is free from this bias.

5. Discussion and Implications for Theory and Practice

The TBL approach has been discussed among scholars in various fields, and has been recognized as a way for firms to achieve competitive advantage (Elkington, 2004; Sénéchal, 2017; Svensson and Wagner, 2015). As the relationships between the elements of TBL are a controversy that has been constantly debated in the sustainability literature, research that examines the relationships between TBL elements in a single comprehensive model is necessary (Svensson *et al.*, 2016). Our study bridges this gap by testing the relationships between elements of TBL while considering EMA as a mediating factor, and provides new empirical evidence for the Indonesian context. Our main findings can be summarized as follows.

First, we found direct relationships between the TBL elements – CFP and CEP, CFP and CSP, and CSP and CEP (Dos Santos *et al.*, 2014; Høgevold *et al.*, 2019; Svensson *et al.*, 2016). That is, the higher the CFP of a firm, the more likely it is to pursue sustainable performance (in our case CEP and CSP). We found that improvements in operational finance and cost efficiency are the most crucial elements in influencing the CEP and CSP of firms in Indonesia. Thus, firms may allocate a certain amount of their resources to make sustainable investments, which will in turn affect their CEP and CSP. As Elkington (2004) argues, this sustainable investment will provide added value, not only in terms of economic aspects, but also for the environmental and social aspects. In addition, by adopting environmentally friendly technologies, making R&D related to the environment, creating social programs, etc., this will lead to an increase in firms’ CEP. Our results corroborate previous studies conducted by Svensson *et al.* (2018) and Laurell *et al.* (2019) related to the TBL model. In addition, our

findings are in line with the propositions and strategies formulated in the NRBV and SRBV theories.

Second, we found evidence of the important roles played by EMA and CSP in mediating the relationship between CFP and CEP. In addition, we also found a direct relationship between CFP and EMA, and between EMA and CEP. Our test results indicate that both EMA and CSP act as partial mediators. We argue that EMA helps companies by providing information that is useful for managers' decision-making, concerning both monetary and non-monetary information. As Adams *et al.* (2004) argue, EMA plays an important role in the relationship between the elements of TBL, and it is considered a managerial tool that helps in corporate decision making. We found that the role of EMA, related to the identification of environment-related costs and the allocation of environment-related costs to production processes, was the most prominent in this study. Hence, EMA acts as an intermediary in the relationship between CFP and CEP. On the other hand, CSP is expected to mediate the relationship between CFP and CEP, because by increasing CSP, CEP will be indirectly affected. We found that CSP related to social activities (such as corporate social responsibility (CSR)) can have a positive effect on CEP. Some scholars, for example Skouloudis *et al.* (2015) and Halkos and Skouloudis (2016), have shown the positive effect of CSR in building a firm's reputation. This result supports the findings of previous studies that have identified the roles of EMA and CSP in mediating the relationship between CFP and CEP (Burritt *et al.*, 2019; Ferreira *et al.*, 2010; Solovida and Latan, 2017; Svensson *et al.*, 2018; Laurell *et al.*, 2019).

Our research provides a number of theoretical and practical implications as follows. In terms of theoretical implications, our findings add new evidence to the sustainable literature, mainly because this is one of the first studies to examine the elements of TBL in a single comprehensive model for the Indonesian context, and also to consider EMA as a mediator. In addition, our findings reconcile mixed results that have previously been tested separately regarding the relationships between TBL elements, and show the role of the third variable that works to mediate these relationships (Dixon-Fowler *et al.*, 2013; Grewatsch and Kleindienst, 2017; Albertini, 2013). While previous works have found inconclusive results among TBL elements (Dos Santos *et al.*, 2014; Laurell *et al.*, 2019; Svensson *et al.*, 2016), our results indicate that EMA can help firms provide information that is useful for decision-making related to achieving shared TBL value creation. Finally, our research provides new insights into the development of the SRBV theory (Tate and Bals, 2018), where the missing

element in the TBL approach can be found. In this context, CSP can be considered to support the achievement of sustainable performance.

In terms of practical implications, our findings offer the following contributions. It is worthwhile to invest in corporate sustainability, because this approach can result in simultaneous improvement to economic, environmental, and social performance, since these elements are in fact integrated (Elkington, 2004). In addition, the possession of EMA management tools is necessary to enhance the relationships between CFP and CEP (Adams *et al.*, 2004). Furthermore, CSP seems to be an important bond between CFP and CEP, meaning that the social element of TBL is necessary to achieve a truly competitive performance. A focus on social activities such as CSR (Skouloudis *et al.*, 2015) might also add value to the economic and environmental aspects of the firm.

6. Conclusions, Limitations and Future Research Directions

This paper discusses the elements of TBL while considering EMA as a mediating variable. The TBL elements tested are CFP, CSP and CEP. All research hypotheses were confirmed, which suggests that the proposed research model is suitable for understanding the relationship between TBL elements and the role of EMA in the context of corporate environmental management in Indonesia, which adds to a broader perspective on the current debate in the field, in the context of sustainability. The main findings of this study indicate that the elements of TBL are integrated with each other and provide added value for all aspects. Therefore, investing in sustainability provides a way for companies to stay afloat and achieve competitive advantage in the current uncertain environment.

Our study has several limitations, which can be noted as follows. First, the sample size used in this study is relatively small and measurements were only taken from the sample in one time period. Furthermore, many respondents still consider information about CFP, CSP and CEP to be confidential to their firm. In addition, a one-year time period for data collection may not be enough to claim causality between variables (Henri *et al.*, 2017). Second, our main findings may not be generalizable to other countries. Svensson *et al.* (2018) indicate that there may be differences in terms of the TBL model between G20 and non-G20 countries. Finally, our results only support the role of the third variable as an indirect effect on the relationships between TBL elements. Recently, there has been a call for further research to examine the relationships between TBL elements by considering the role of moderating variables (Dixon-Fowler *et al.*, 2013; Grewatsch and Kleindienst, 2017).

We suggest the following directions for future research. First, future studies might consider the role of moderating variables in influencing the relationships between TBL elements. For example, the effects of firm characteristics (Grewatsch and Kleindienst, 2017) may provide new insights into the TBL literature. In addition, considering the role of antecedent variables in supporting the relationships between TBL elements, such as environmental committees (Dixon-Fowler *et al.*, 2017) and institutional and stakeholder pressures (Hamdoun, 2020) is an area which may prove fruitful for further investigation. Furthermore, future studies may consider using longitudinal data, which is important in order to see changes in TBL elements from year to year. We argue that studies like this are important, but are rarely conducted. Second, we propose a research call to replicate this study in other country contexts. For example, using the CSR score list from Halkos and Skouloudis (2016), it might be useful to make a comparative study between countries. Finally, we encourage future research using a mixed methods approach to investigate the relationships between TBL elements. Based on our best knowledge, no previous study has used this approach in investigating the TBL model (Orlitzky *et al.*, 2017), in which most studies focus on only one stream, such as quantitative (Svensson *et al.*, 2018) or qualitative (Høgevold *et al.*, 2019).

Appendix A: Measurement Items

Construct	Code	Indicator/Item	Adapted from
Economic Performance (CFP)	ECOP1	Our sustainable business practices improved cost efficiency.	Svensson <i>et al.</i> (2016), Svensson <i>et al.</i> (2018) and Laurell <i>et al.</i> (2019)
	ECOP2	Our sustainable business practices created a competitive advantage for the company.	
	ECOP3	Our sustainable business practices enhanced the company's image in the market.	
	ECOP4	Our sustainable business practices contributed positively to other aspects of the company's business operations.	
	ECOP5	Our sustainable business practices improved operational finances	
	ECOP6	Our sustainable business practices generated financial benefits for the company	
Social Performance (CSP)	SP1	Our sustainable business practices positively impacted 'word-of-mouth' about the company.	Svensson <i>et al.</i> (2016), Svensson <i>et al.</i> (2018) and Laurell <i>et al.</i> (2019)
	SP2	Our sustainable business practices are appreciated by all stakeholders.	
	SP3	Our sustainable business practices have considered the social well-being of society as a whole.	
	SP4	Our sustainable business practices focused on social (i.e. relational or societal) aspects	
Environmental Performance (CEP)	ENVP1	Our sustainable business practices focused on environmental issues.	Svensson <i>et al.</i> (2016), Svensson <i>et al.</i> (2018) and Laurell <i>et al.</i> (2019)
	ENVP2	Our sustainable business practices diminished the corporate impact on the natural environment.	
	ENVP3	Our sustainable business practices considered the effects of corporate business operations on global warming.	
	ENVP4	Our sustainable business practices highlighted each product's footprint on the natural environment.	
	ENVP5	Our sustainable business practices addressed activities related to the environmental impact of products.	

Construct	Code	Indicator/Item	Adapted from
Environmental Management Accounting (EMA)		Please indicate the extent to which your company has done each of the following in the past three years:	
	EMA1	Identification of environment-related costs.	
	EMA2	Estimation of environment-related contingent liabilities.	
	EMA3	Classification of environment-related costs.	
	EMA4	Allocation of environment-related costs to production processes.	
	EMA5	Allocation of environment-related costs to products.	
	EMA6	Introduction or improvement of environment-related cost management.	Ferreira <i>et al.</i> (2010) and Christ and Burritt (2013)
	EMA7	Creation and use of environment-related cost accounts.	
	EMA8	Development and use of environment-related key performance indicators (KPIs).	
	EMA9	Product life-cycle cost assessments.	
	EMA10	Product inventory analyses.	
	EMA11	Product impact analyses.	
	EMA12	Product improvement analyses.	

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Table 1
Assessment of Non-Response Bias

Construct	Sig. Levene's Test	Sig. t-test for Equality of Means
Economic Performance (CFP)	0.102	0.447
Social Performance (CSP)	0.533	0.611
Environmental Management Accounting (EMA)	0.086	0.504
Environmental Performance (CEP)	0.063	0.995

Table 2
Profile of Firms

Category	Frequency	Percentage (%)
No. of Employees		
<250	8	9.20
250 – 500	12	13.79
501 – 1000	17	19.54
1001 – 2500	36	41.38
2501 – 5000	9	10.34
>5000	5	5.74
Sales Volume		
< 50 billion IDR	9	10.34
51 – 70 billion IDR	15	17.24
71 – 100 billion IDR	23	26.44
101 – 200 billion IDR	28	32.18
> 200 billion IDR	12	13.79
Industry		
Food and beverages	26	29.89
Textile	7	8.04
Paper	6	6.90
Chemical	12	13.79
Metal products	16	18.39
Automotive	3	3.45
Machinery and equipment	8	9.19
Oil and gas	14	16.09
Other manufacturing	5	5.75

Table 3

Measurement Model Assessment of Economic, Social and Environmental Performance

Indicator/Item	Code	Mean	S.D	FL ^a	AVE	α	ρ_A
A) Economic Performance (CFP)					0.849	0.964	0.966
Improved cost efficiency	ECOP1	5.736	1.045	0.919			
Created a competitive advantage for the company	ECOP2	5.759	0.970	0.915			
Enhanced the company's image in the market	ECOP3	5.690	1.043	0.917			
Contributed positively to other aspects of the company's business operations	ECOP4	5.678	1.045	0.925			
Improved operational finances	ECOP5	5.770	0.979	0.933			
Generated financial benefits for the company	ECOP6	5.678	1.119	0.919			
B) Social Performance (CSP)					0.762	0.896	0.897
Positively impacted 'word-of-mouth' about the company	SP1	5.839	1.123	0.885			
Appreciated by all stakeholders	SP2	5.667	1.002	0.879			
Considered the social well-being of society as a whole	SP3	5.644	0.934	0.846			
Focused on social (i.e. relational or societal) aspects	SP4	5.586	0.941	0.881			
C) Environmental Performance (CEP)					0.745	0.914	0.917
Focused on environmental issues	ENVP1	5.724	0.854	0.840			
Diminished the corporate impact on the natural environment	ENVP2	5.529	0.856	0.848			
Considered the effects of corporate business operations on global warming	ENVP3	5.897	0.983	0.909			
Highlighted each product's footprint on the natural environment	ENVP4	5.920	1.008	0.894			
Addressed activities related to the environmental impact of products	ENVP5	5.724	0.979	0.823			

Note: ^aFL is factor loading; S.D. is standard deviation; AVE = Average variance extracted; α = Cronbach's Alpha; ρ_A = Dijkstra-Henseler's rho_A.

Table 4

Measurement Model Assessment of Environmental Management Accounting

Indicator/Item	Code	Mean	S.D	FL ^a	AVE	α	ρ_A
A) Environmental Management Accounting(EMA)					0.534	0.920	0.935
Identification of environment-related costs	EMA1	5.655	1.112	0.869			
Estimation of environment-related contingent liabilities	EMA2	5.540	1.112	0.820			
Classification of environment-related costs	EMA3	5.632	1.095	0.818			
Allocation of environment-related costs to production processes	EMA4	5.678	1.088	0.836			
Allocation of environment-related costs to products	EMA5	5.632	1.052	0.812			
Introduction or improvement of environment-related cost management	EMA6	5.425	0.853	0.650			
Creation and use of environment-related cost accounts	EMA7	5.391	0.987	0.642			
Development and use of environment-related key performance indicators (KPIs)	EMA8	5.322	0.903	0.696			
Product life-cycle cost assessments	EMA9	5.276	0.967	0.712			
Product inventory analyses	EMA10	5.322	0.977	0.715			
Product impact analyses	EMA11	5.310	0.986	0.590			
Product improvement analyses	EMA12	5.299	0.924	0.521			

Note:^aFL is factor loading; S.D. is standard deviation; AVE = Average variance extracted; α = Cronbach's Alpha; ρ_A = Dijkstra-Henseler's rho_A.

Table 5

Assessment of Discriminant Validity using the HTMT Test

Construct	1	2	3	4
CFP	(0.900)			
EMA	0.499[0.344;657]	(0.900)		
CEP	0.774[0.664;816]	0.714[0.599;811]	(0.900)	
CSP	0.711[0.568;829]	0.535[0.382;679]	0.744[0.603;818]	(0.900)

Note: brackets show the lower and upper bounds of the 95% BCa confidence intervals.

Table 6

Structural Model Assessment

Construct	R ²	Adj. R ²	f ²	Q ²	VIF	AFVIF
Economic Performance (CFP)	–	–	0.246 – 0.792	–	1.940	2.393
Social Performance (CSP)	0.442	0.436	0.290	0.314	1.909	2.082
Environmental Management Accounting (EMA)	0.259	0.251	0.093	0.118	1.438	1.749
Environmental Performance (CEP)	0.686	0.674	–	0.471	–	3.100

Table 7

Testing of Hypotheses (Direct Effect)

Structural path	Coef(β)	S.D.	p value	95% BCa CI	Conclusion
CFP → CEP	0.387	0.100	0.000**	(0.559, 0.005)**	H1 supported
CFP → CSP	0.665	0.073	0.000**	(0.763, 0.001)**	H2a supported
CSP → CEP	0.236	0.098	0.009**	(0.400, 0.005)**	H2b supported
CFP → EMA	0.509	0.089	0.000**	(0.637, 0.009)**	H3a supported
EMA → CEP	0.362	0.082	0.000**	(0.493, 0.001)**	H3b supported

Note: **, *statistically significant at the 1 percent and 5 percent levels, respectively.

Table 8.

Testing of Hypotheses (Indirect Effect)

Structural path	Coef (β)	S.D.	p value	95% BCa CI	Conclusion
CFP → CSP → CEP	0.157	0.072	0.015*	(0.289, 0.005)**	H4a supported
CFP → EMA → CEP	0.184	0.046	0.000**	(0.269, 0.000)**	H4b supported
Direct effect	Coef (β)	R ²	$a \times b / a \times b + c$	VAF	Conclusion
<i>c</i>	0.731	0.534	–	–	Partial mediation
<i>a</i> ₁	0.510	–	0.211 / 0.942	22.40%	
<i>b</i> ₁	0.413	0.656	–	–	
<i>a</i> ₂	0.666	–	0.225 / 0.956	23.53%	Partial mediation
<i>b</i> ₂	0.338	0.597	–	–	

Note: **, *statistically significant at the 1 percent and 5 percent levels, respectively; *c* is simple cause-effect, *a* and *b* are general mediation model.

Table 9.**Assessment of Endogeneity Bias using the Heckman Test**

Test	Coef (β)	<i>p</i> value	<i>z</i>	Conclusion
CFP → CEP (Selection DV = CSP; IV = EMA)	0.514	0.000**	9.85**	Not present
CFP → CSP (Selection DV = CEP; IV = EMA)	0.406	0.000**	8.29**	Not present
CSP → CEP (Selection DV = EMA; IV = CFP)	0.775	0.000**	8.43**	Not present
CFP → EMA (Selection DV = CEP; IV = CSP)	0.745	0.000**	5.12**	Not present
EMA → CEP (Selection DV = CSP; IV = CFP)	0.303	0.000**	8.23**	Not present

Note: DV is dependent variables, IV is independent variables **, *statistically significant at the 1 percent and 5 percent levels, respectively.

Table 10.**Assessment of Nonlinear Effects**

Structural path	Coef (β)	<i>p</i> value	f^2	Ramsey's RESET
CFP*CFP → CSP	-0.173	0.073	0.042	
CFP*CFP → CEP	0.192	0.092	0.034	$F(2.261) = 0.42, p = 0.313$
CFP*CFP → EMA	0.286	0.100	0.089	
CSP*CSP → CEP	-0.123	0.066	0.047	$F(1.864) = 0.78, p = 0.695$
EMA*EMA → CEP	0.147	0.109	0.015	

Note: **, *statistically significant at the 1 percent and 5 percent levels, respectively.

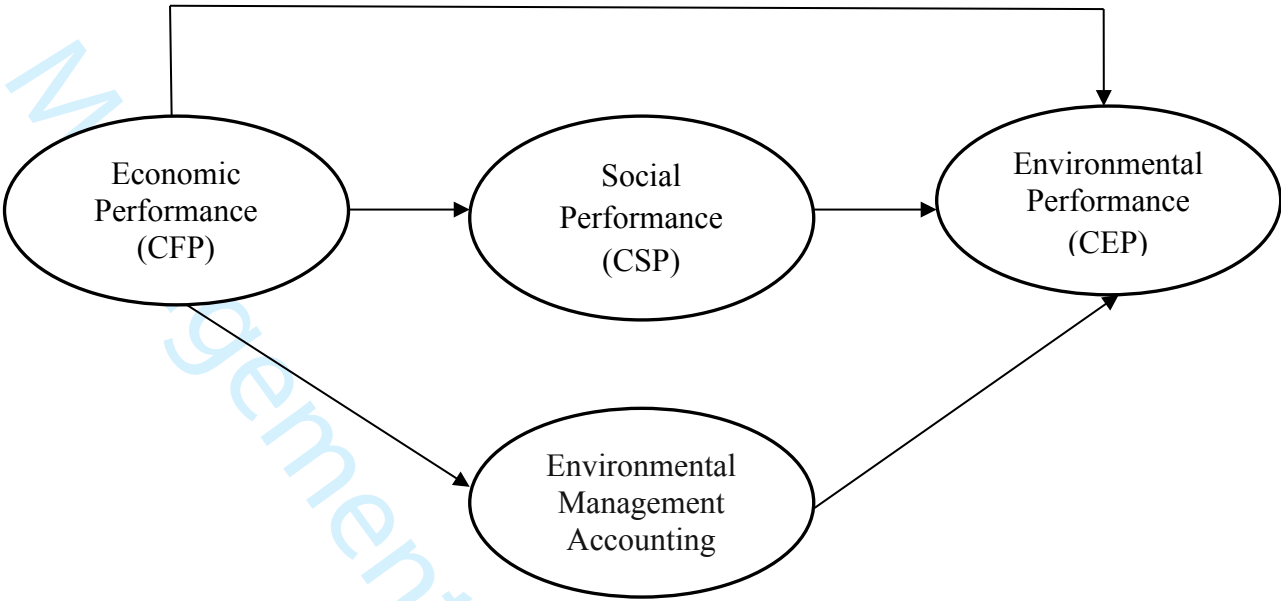


Fig 1. Theoretical framework depicting the relationships between variables

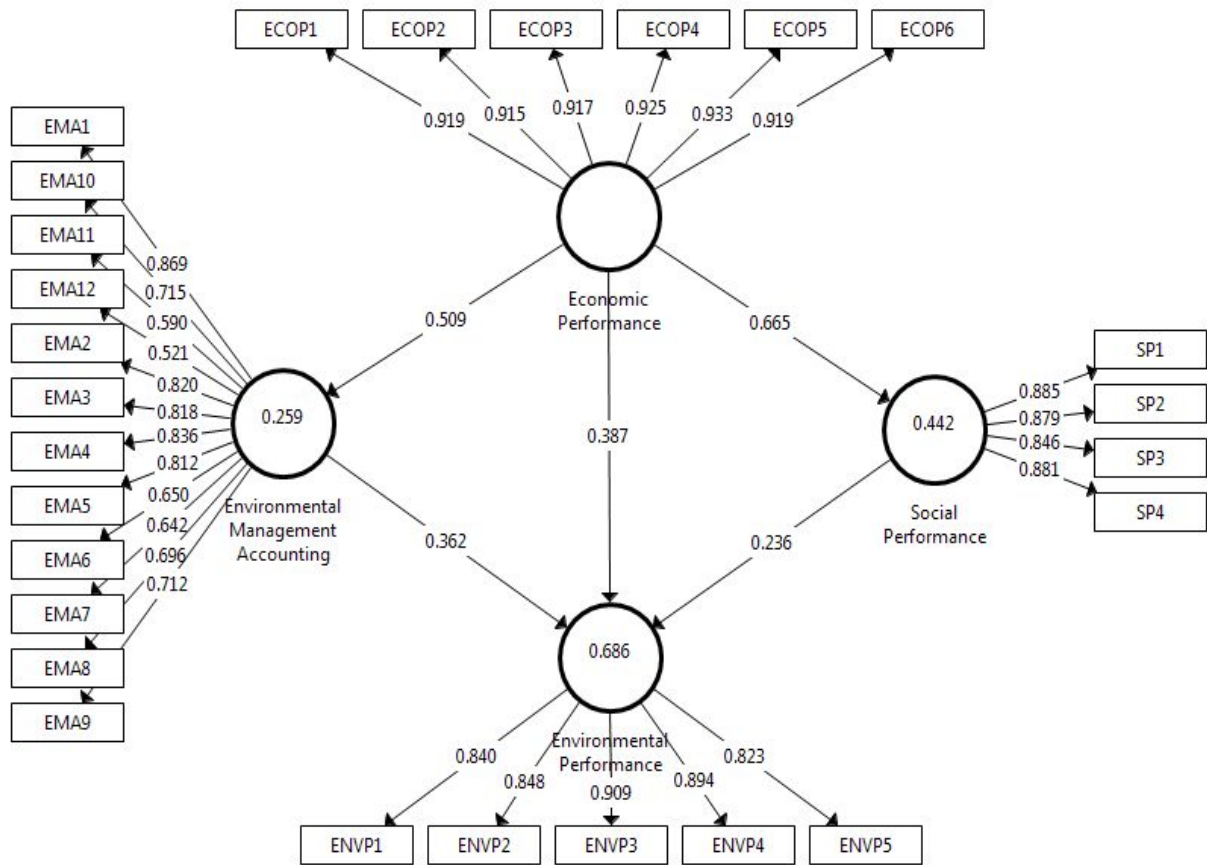


Fig 2. Evaluation of the measurement and structural models



Achieving Triple Bottom Line Performance: Highlighting the Role of Social Capabilities and Environmental Management Accounting

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MEQ-09-2020-0202.R2 (Minor Revision)

Dear Respected Editor, Professor Malin Song
Management of Environmental Quality: An International Journal

Subject: Submission of revised MEQ-09-2020-0202.R2

First of all, the authors of this submission hope that you are well, safe and healthy during this challenging time.

We are excited to have been given the opportunity to further improve our manuscript and to have this manuscript published in the MEQ. Thank you very much indeed for handling this submission!

We have carefully addressed your minor comments given into this new version of our manuscript. Please kindly consider the improved version of the paper included here, following these minor comments.

In the following section, we offer detailed responses for your previous comments given.

Yours sincerely,

The author(s)

Table of Actions – MEQ R3

Editor's Comments	Authors' Comments
Please get the article down to 9000 words in total (it's currently 12,925 words). Articles should be between 7000 and 9000 words in length. This includes all text including abstract, figures, tables, references and appendices (280 words for each figure or table).	Dear Editor, We would like to thank you very much for these minor comments and acceptance letter for this manuscript. We have amended the manuscript to address your concern. Many thanks and all the best! Regarding the word length, we would like to inform you that the total word length of our manuscript is initially 10,000+ and not 12,925 (this includes abstract, tables, figures, references and appendices). We don't know where you got this number. We suspect that you calculated word length including all of our comments to the reviewers in previous rounds. Hence, it reaches 13,000 words. While we believe that many articles are 10,000 words long, we have reduced our manuscript as much as we can, so that it is now 9,000+. Please note that reducing the number of words too significantly will have a negative impact on the article as a whole (e.g., omitting some important information). Therefore, our current version of the article is short and we couldn't reduce it any further. We hope you understand this.

Achieving Triple Bottom Line Performance: Highlighting the Role of Social Capabilities and Environmental Management Accounting

Abstract

Purpose – The relationship between the elements of the Triple Bottom Line (TBL) is a controversial area that is constantly debated in the sustainability literature. Our study addresses this debate by testing the relationships between these elements, while considering Environmental Management Accounting (EMA) as a mediating influence.

Design/methodology/approach – This paper examines survey responses from upper-level managers from ISO 14001-certified manufacturing companies listed on the Indonesian Stock Exchange. The hypotheses were tested using a partial least squares approach and bias-corrected and accelerated bootstrap confidence intervals to test the significance of the relationships between variables.

Findings – We found a direct relationship between the TBL elements and the role of EMA and social performance in mediating the relationship between economic performance and environmental performance.

Research limitations/implications – Our research also provides new insights into the progress of the Social Resource Based View theory, where the social element missing from the TBL approach can be found.

Practical implications – The findings of this article imply that it is worthwhile to invest in corporate sustainability, because it is thereby possible to simultaneously achieve economic, environmental and social performance, since such elements are truly integrated. In addition, possession of EMA management tools is necessary to enhance the relationships between economic performance and environmental performance. Furthermore, social performance seems to constitute an important bond between both of these, indicating that the social element of the TBL is necessary to achieve truly competitive performance.

Originality/value – This study contributes to the corporate environmental management literature by providing empirical evidence regarding the TBL elements.

Keywords Corporate Sustainability, Triple Bottom Line, Environmental Management Accounting, Corporate Environmental Performance and ISO 14001.

Paper type Research paper

1. Introduction

In the past decade, research topics within the fields of sustainability, cleaner production and environmental issues have been discussed extensively among scholars in various disciplines (Chiappetta Jabbour *et al.*, 2010; Høgevold *et al.*, 2019; Laurell *et al.*, 2019; Orlitzky *et al.*, 2017; Sénéchal, 2017; Solovida and Latan, 2017; Wang and Sarkis, 2017). In particular, the concept of the ‘triple bottom line’ (TBL) has become an established theoretical blueprint (Elkington, 1998). The concepts involved in the TBL focus firms not just on the economic value that they add, but also on the environmental and social value that they add (Elkington, 2004). This framework has been widely adopted and has led to transformation among firms in engaging with sustainable investment (Dos Santos *et al.*, 2014; Høgevold *et al.*, 2019). However, to date, little is known about the relationships between the elements which make up the TBL, and there is a lack of empirical studies addressing this topic as a whole (Svensson *et al.*, 2018).

Specifically, rather than thoroughly analyzing the relationships between the TBL elements, previous studies have predominantly tested the elements of TBL separately. For example, most research has devoted its attention to the relationship between corporate financial performance (CFP) and corporate environmental performance (CEP) (Albertini, 2013; Latan *et al.*, 2018b; Trumpp and Guenther, 2017; Wagner, 2015), providing mixed results. Such research ignores social performance as the third element of TBL (Cegarra-Navarro *et al.*, 2016; Ullmann, 1985). On the other hand, some studies have also focused on the relationship between corporate social responsibility (CSR) and financial performance, without achieving conclusive results (Brammer and Millington, 2008; Beurden and Gossling, 2008; Orlitzky *et al.*, 2003; Waddock and Graves, 1997). Meanwhile, TBL assumes that its three pillars – economic, environmental and social – are interconnected and must be integrated in order to achieve competitive advantage (Elkington, 2004). Because there is no general consensus on the relationships between the elements of TBL, and because there is a lack of studies that provide concrete evidence on TBL, there is an urgent demand to re-examine these relationships in a single model (Svensson *et al.*, 2016; Laurell *et al.*, 2019).

This article aims to fill this persistent gap by testing the elements of TBL in a single model using ISO 14001-certified manufacturing companies listed on the Indonesian Stock Exchange (IDX). In addition, we also analyse environmental management accounting (EMA) as a mediator in the relationships between TBL elements (Burritt *et al.*, 2009; Christ *et al.*, 2016; Jasch, 2006). We argue that EMA plays an important role in bridging the

relationships between TBL elements, by providing information that is useful to managers' decision making.

EMA can be understood as a set of management tools that allows companies to improve their CFP, CEP and CSP by providing monetary information, such as costs and revenue, as well as non-monetary information such as energy, water and material usage or carbon dioxide emissions (Jasch, 2006; Christ and Burritt, 2013). Several previous studies have indicated that EMA is a useful instrument for improving CEP (Ferreira *et al.*, 2010; Solovida and Latan, 2017) in relation to providing information for companies (Burritt and Saka, 2006; Burritt *et al.*, 2019; Chiappetta Jabbour *et al.*, 2013).

We tested our model and collected data in Indonesia, a country with one of the largest levels of economic growth in the world, and part of the G20. Indonesia is predicted to become the fourth strongest economy in the world in 2045, according to research conducted by PricewaterhouseCoopers (PwC) in 2017. In addition, Indonesia offers an interesting phenomenon in terms of the TBL model, with previous studies reporting a lack of CEP in firms operating in Indonesia (Burritt *et al.*, 2019; Latan *et al.*, 2018a). According to the United Nations Environment Program (UNEP) report in 2018, Asia-Pacific is the fastest-growing region in the world. This economic boom has lifted many out of poverty, but it has also caused significant environmental degradation, with negative effects on human wellbeing. Because of these important issues in Indonesia, research specific to the Indonesian context has become an urgent demand.

Our study extends the state-of-the-art research in the field of sustainability and environmental management and provides original evidence in three ways. First, we answer the research call from Svensson *et al.* (2016) to test the elements of TBL in a single comprehensive model. Our study is the first to address these gaps by providing original evidence on the relationships between TBL elements in a single comprehensive model in the Indonesian context – a country that is part of the G20. Second, we reconcile the mixed results found in previous studies regarding TBL elements. Our research provides new insights into the development of the Social Resource Based View (SRBV) theory (Tate and Bals, 2018), which includes the social element missing from the TBL approach. While a plethora of emerging research studies has dealt separately with the relationships between CFP and CEP, as well as CSR and CFP, their results remain at times unclear and contradictory (Beurden and Gossling, 2008; Dixon-Fowler *et al.*, 2013; Orlitzky *et al.*, 2003). Our study re-examines the relationships between TBL elements by considering the role of EMA as a mediating factor.

Jasch (2006) argues that EMA is a useful tool for providing information to improve CEP. Based on our best knowledge, our research is the first to test the TBL model while also considering the role of EMA. Therefore, we add new empirical evidence to the sustainability and environmental management literature.

Finally, our research contributes fresh empirical evidence in the context of developing countries – in this case, Indonesia. Although a small number of studies related to TBL and EMA have been conducted in the Asia-Pacific region, including Australia, China, Japan, Philippines and Thailand (Burritt *et al.*, 2019; Burritt and Saka, 2006; Schaltegger *et al.*, 2008), most of this research has been carried out through case studies. Although qualitative studies have indicated that the elements of TBL are interrelated with one another in decision making for business sustainability, it is important to examine the relationships between these elements empirically. Hence, our study contributes by testing the relationships between the TBL elements in the Indonesian context both empirically and simultaneously.

The remainder of this paper is organized as follows. The next section presents the theoretical background and development of hypotheses, followed by the research methodology. Subsequently, we present our empirical results. Finally, we discuss these results and provide implications that may be useful for both academics and practitioners.

2. Theoretical Background and Development of Hypotheses

2.1. The natural resource-based view (NRBV) and sustainability

One of the main sustainability theories supporting the relationship between CFP and CEP is the natural resource-based view (NRBV) (Hart, 1995; Hart and Dowell, 2011). The NRBV is an extension of the resource-based view (RBV), which focuses not only on CFP, but also on sustainable development, including CEP. The basic assumption of the RBV is that the basis of competitive advantage lies in the application of each firm's unique combination of valuable resources and capabilities to improve efficiency and business performance (Barney, 1991; Newbert, 2007). This implies that only firms that can use resources effectively and have the ability to innovate will gain competitive advantage and, therefore, achieve superior performance. Sustainable competitive advantage is determined based on the firm's ability to reconfigure its valuable and idiosyncratic resources. According to the RBV, these resources should be inimitable, rare and non-tradable (Barney, 1991; Hart, 1995; Russo and Fouts, 1997).

Hart and Dowell (2011) evaluated fifteen years of the development of the RBV, based on various empirical results concerning the propositions of the RBV, and thus formulated the NRBV. These authors argue that the RBV does not consider CEP, while environmental and sustainability issues have in recently years become widely discussed topics. Therefore, the RBV was revisited. Building on the logic of the RBV, the NRBV describes how firms can achieve competitive advantage by means of cost efficiency relating to environmental issues and minimizing environmental impact across the entire value chain of the firm. Specifically, the NRBV consists of three interrelated strategies: (1) pollution prevention, which focuses on minimizing waste, emissions and effluents with the aim of increasing efficiency and reducing costs; 2) product stewardship, which focuses on minimizing the entire value chain costs of products and thus expands the scope of pollution prevention; and (3) sustainable development, which focuses on sustainable growth of the firm while reducing environmental damage. Hence, the NRBV strategy emphasizes not only financial growth, but also environmental aspects (Hart and Dowell, 2011).

However, neither RBV nor NRBV take into account the social dimension of TBL, creating a persistent gap in the sustainability literature. As a result, a large number of studies use the term 'sustainability' but, in fact, only investigate CFP and CEP. Driven by this gap, Tate and Bals (2018) propose incorporating the social element of TBL as a complement to the propositions expressed in RBV and NRBV. Thereby, the social resource-based view (SRBV) is created, to show how social capabilities can be used to achieve competitive advantage. Tate and Bals (2018) suggest that the three elements of TBL – CFP, CEP and CSP – must be connected in order to achieve shared TBL value creation.

2.2. The social resource-based view (SRBV) and sustainability

Recently, Tate and Bals (2018) have proposed the social resource-based view (SRBV), which emphasizes the role of social capabilities in the achievement of competitive advantage. They argue that social performance has received too little attention in the context of business performance and sustainability. According to Tate and Bals (2018), RBV and NRBV do not capture social performance, the third element of the TBL model. This neglect is due to the RBV focusing on CFP in order to maximize profits, while the NRBV focuses on CEP for the preservation of the natural environment; neither focuses on social capabilities. Therefore, the SRBV complements RBV and NRBV by focusing more on CSP than CFP and CEP. Inspired by RBV and NRBV, SRBV uses two main strategies: 1) a mission-based approach, which focuses on maximizing social benefits while breaking even and becoming

profitable in order to perpetuate the business model; and 2) stakeholder management, which focuses on maximizing support in terms of products, information and funds from a broad stakeholder base (Tate and Bals, 2018).

In this paper, we examine the relationships between the elements of the TBL model –CFP, CSP and CEP – while considering EMA as a mediator in these relationships. We test this model simultaneously and explain the relationships between these variables based on our conceptual framework and the results of previous studies, and thus derive our hypotheses. First, we hypothesize regarding the direct effects of the relationships between CFP, CSP and EMA on CEP. Second, we hypothesize regarding the indirect effects between these relationships. Figure 1 presents our theoretical model.

2.3. The relationship between the TBL elements – economic, social and environmental performance

Topics related to social and environmental issues began to be studied around the 1970s, but interest in such issues has grown exponentially in the past decade. Nowadays, firms are not solely focused on short-term performance through reliance on CFP, but also consider sustainable performance, which depends on three dimensions: the social dimension, relating to community welfare; the environmental (or ecological) dimension, which relates to the preservation of the natural environment; and the financial dimension, aimed at cost efficiency and boosting benefits (Svensson *et al.*, 2016; Sénéchal, 2017).

In all three of RBV, NRBV and SRBV, CFP is the first pillar which supports sustainable performance. In this view, the capabilities of the firm in developing and managing a bundle of resources such as technology, design, procurement, production, distribution and service are the main keys to achieving competitive advantage (Barney, 1991; Hart, 1995; Hart and Dowell, 2011; Russo and Fouts, 1997; Tate and Bals, 2018). The goal is to achieve cost differentiation, and to gain a more advantageous position than competitors. A firm that has grown in terms of CFP will in turn pursue sustainability performance by focusing on improving CSP and CEP. By focusing on CSP and CEP, a firm will gain additional benefits and reduce costs across the entire value chain. Hence, an increase in CFP will positively influence the firm's CSP and CEP. For example, companies can adopt environmentally friendly technologies, conduct R&D to minimize environmental damage and create programs for social responsibility. All of these actions have an impact not only on cost efficiency, but also on reputation, image and organizational learning (Lankoski, 2008; Hart and Dowell, 2011; Tate and Bals, 2018).

Several previous studies have found a positive effect based on the relationships between CFP and CEP (Laurell *et al.*, 2019; Svensson *et al.*, 2018; Testa and D'Amato, 2017), CFP and CSP (Brammer and Millington, 2008; Brammer *et al.*, 2006; Waddock and Graves, 1997; Scholtens, 2008) and CSP and CEP (Orlitzky *et al.*, 2017; Garcia-Castro *et al.*, 2010; Laurell *et al.*, 2019; Svensson *et al.*, 2018). Based on the above discussion, we derive the following hypotheses:

H1: CFP has a positive and direct effect on CEP.

H2a: CFP has a positive and direct effect on CSP.

H2b: CSP has a positive and direct effect on CEP.

2.4. Indirect effects between the TBL elements through EMA

Over the past decade, the study of the relationships among the elements of TBL has had a prominent place in the sustainability literature. However, although hundreds of separate studies have been carried out and reported, inconsistent and disappointing results have provoked recent debate. This is because the relationships between the elements of TBL have continually produced mixed research results. Several meta-analytical studies have revealed that such mixed results found by scholars may be determined further by examining the role of a third variable. For example, Dixon-Fowler *et al.* (2013) and Grewatsch and Kleindienst (2017) suggest introducing mediator or moderator variables into the relationships between these TBL elements. Meanwhile, a study conducted by Svensson *et al.* (2018) shows that the role of the third variable works well in analyzing the relationships between TBL elements. Specifically, Svensson *et al.* (2018) found that CSP mediated the relationship between CFP and CEP.

Based on the logic of NRBV and SRBV (Hart and Dowell, 2011; Tate and Bals, 2018), firms that achieve superior performance are not only able to manage CFP, but also CSP and CEP. In this situation, a firm that has excelled in CFP can directly increase its CEP by adopting environmentally friendly technologies, adopting various quality standards and developing programs related to the environment etc. for cost efficiency (Lankoski, 2008). Conversely, a firm that focuses on increasing CSP will ultimately indirectly increase its CEP as well (Garcia-Castro *et al.*, 2010; Orlitzky *et al.*, 2017; Svensson *et al.*, 2016), given that CSP and CEP are interconnected.

In addition, several scholars have indicated that EMA is an intermediary in the relationships between TBL elements (Ferreira *et al.*, 2010; Christ and Burritt, 2013; Solovida and Latan, 2017). A firm that is successful in managing CEP requires a set of tools that can

provide information for decision-making. EMA offers this information, providing information related not only to monetary factors such as costs and revenue, but also non-monetary information concerning energy, water, materials or carbon dioxide emissions. Previous research conducted by Burritt *et al.* (2019), Ferreira *et al.* (2010) and Solovida and Latan (2017) indicates that EMA can mediate the relationship between CFP and CEP. Based on the above discussion, we derive the following hypotheses:

H3a: CFP has a positive and direct effect on EMA.

H3b: EMA has a positive and direct effect on CEP.

H4a: CFP has a positive and indirect effect on CEP through CSP.

H4b: CFP has a positive and indirect effect on CEP through EMA.

Figure 1 portrays the research framework empirically tested in this work.

*****PLEASE INSERT FIGURE 1 HERE*****

3. Research Method

3.1. Sample and data collection

The sample in this study is composed of upper-level managers (i.e., general managers, operations managers, financial managers and environmental managers) from ISO 14001-certified manufacturing companies listed on the Indonesian Stock Exchange (IDX). ISO 14001 is an international standard awarded to companies that have adopted environmentally friendly processes and products. Our sampling frame was determined based on data provided by IDX (www.idx.co.id) and the Indonesian Ministry of Environment and Forestry. According to this database, in 2018 there were a total of 285 companies with ISO 14001 certification operating in Indonesia. We contacted all of these companies to ask them to participate in our survey, and received approval from 109 companies.

After receiving approval, we conducted pre-testing to minimize potential bias and ensure the appropriate operation of the questionnaire before it was sent to the target respondents (Fowler Jr, 2013; Groves *et al.*, 2009). We held discussions with four academics and business professionals to assess the content validity of the questionnaire. The academics consulted were senior researchers in the field of environment and sustainability, with strong reputations in this field, while the business professionals were Chief Executive Officers (CEO) and consultants. Some improvements were made to the questionnaire in terms of phrasing, clarity and accuracy of the questions in order to be understandable and avoid

questions which were vague, ambiguous, or difficult to answer. The final version of this questionnaire was sent to 22 companies for preliminary analysis and we thereby assessed the validity and reliability of the indicators in the model. The results of our preliminary analysis indicated that the items used are valid and reliable for measuring the variables in our model.

We conducted data collection between June and December 2018 using an online survey, as well as contacting each respondent via telephone calls and emails. We chose this method because it is considered effective for reaching a broad range of respondents at low cost (Dillman *et al.*, 2014; Groves *et al.*, 2009). In order to increase the response rate, we sent several reminder e-mails and made several phone calls to non-responders. We also guaranteed the anonymity of responses and did not disclose the identity of the companies involved. Finally, we provided a cut-off date of five months for completion of this survey for the purpose of testing non-response bias (Dillman *et al.*, 2014; Fowler Jr, 2013).

At the time of the deadline, we had received 91 returned questionnaires; four of these were excluded due to incompleteness, giving an overall response rate of 19.95%. We argue that this response is acceptable for studies in sustainability and the environment (Dubey *et al.*, 2017; Wijethilake, 2017), with some studies giving rates lower than this threshold (Christ and Burritt, 2013; Ferreira *et al.*, 2010). However, in order to ensure that there were no biases or differences between respondents and non-respondents in this survey, we tested non-response bias by comparing those who responded early and those who responded late in the survey period (Clottey and Grawe, 2014; Dalecki *et al.*, 1993). We assume for this purpose that late respondents are similar to non-respondents, in terms of time taken to reply. We used a t-test to assess differences in the means of the two sample groups. Our results did not find significant ($p > 0.05$) differences between these groups of respondents (see Table 1). In addition, we compared socio-demographic variables (i.e., gender and age) using a Bonferroni test to maintain the robustness of these results. Our results indicate a similar response rate across subgroups, which indicates that our data is free of non-response bias (Clottey and Grawe, 2014; Groves, 2006). Finally, we tested for common method bias (CMB), which is another potential source of bias when using the survey method (Siemsen *et al.*, 2010). We used full collinearity VIFs (AFVIF), an approach proposed by Kock (2015) to assess CMB between the item correlations of two constructs. Our analysis results resulted in an AFVIF value of $2.887 < 3.3$, which indicates that CMB does not occur in our measurements. A summary of the profile of participating firms can be seen in Table 2 below.

*****PLEASE INSERT TABLE 1 HERE*****

*****PLEASE INSERT TABLE 2 HERE*****

3.2. *Measurement items and scales*

In survey-based studies, measurement scales and indicators are crucial elements in order to produce unbiased estimates. We used measurement scales and indicators adopted from previous studies in the field of environment and sustainability in order to avoid scale proliferation. We consider that these indicators have been validated through the test-retest method and are well established. We used multiple indicators rather than a single indicator to measure each construct in the model, in order to capture the essence of the variables with a degree of precision that a single item could not attain (DeVellis, 2017). This method aims to reduce measurement errors and improve the validity and reliability of indicators. We measured CFP, CSP and CEP using indicators adopted from Svensson *et al.* (2016), Svensson *et al.* (2018) and Laurell *et al.* (2019). We used a 7-point Likert scale across a total of 15 items, including 6, 4 and 5 indicators to measure CFP, CSP and CEP, respectively. This scale ranges from 1 = “strongly disagree” to 7 = “strongly agree”. Subsequently, we measured EMA using indicators adopted from Ferreira *et al.* (2010) and Christ and Burritt (2013). We used a 7-point Likert scale with 12 indicators to measure this construct. This scale ranges from 1 = “does not at all” to 7 = “does to a great extent”.

3.3. *Data analysis*

The structural equation modeling (SEM) method was used to simultaneously test the relationships between unobserved variables in our model. Two SEM approaches – covariance structure analysis (CSA) and partial least squares path modeling (PLS-PM) – are available to analyze our data (Henseler, 2021; Jöreskog *et al.*, 2016). We chose PLS-PM due to some favorable considerations over CSA. First, PLS-PM is a soft modeling approach, which uses non-parametric assumptions. Hence, PLS-PM does not depend on the parametric assumptions of Maximum Likelihood (ML), such as multivariate normality or goodness-of-fit of model. In addition, PLS-PM avoids the problem of Heywood cases in our data. Second, PLS-PM has a “causal-predictive” nature and aims to predict relationships between variables, rather than testing causality to confirm theories (Hair *et al.*, 2019; Pearl *et al.*, 2016). Here, this approach allows us to strike a balance between explanation and prediction, given that our model has a relative scarcity of theory and knowledge. Finally, PLS-PM allows us to test the specific indirect effects between latent variables and conduct a series of robustness tests (Latan, 2018). In this case, PLS offers advanced features with a user-friendly interface.

In this study, we have followed the current guidelines for reporting PLS-PM analysis, which are well-documented in the literature (Latan, 2018; Benitez *et al.*, 2020). Specifically, the three main steps which we conducted and reported are as follows. First, we assessed and evaluated the results of the measurement model. This is intended to assess the validity and reliability of construct indicators (i.e., convergent validity, discriminant validity and internal consistency reliability). Second, we assessed and evaluated the results of the structural model. This is intended to assess the overall fit of the model (i.e., r-square, effect size and predictive relevance) and test our hypotheses. Finally, we ran several series of robustness tests to ensure that our main results are not biased (i.e., endogeneity testing, unobserved heterogeneity and non-linear effects).

4. Results

We used the SmartPLS 3 software (Ringle *et al.*, 2015) to estimate the parameters of our model using a number of specific settings, as follows. In the PLS-PM algorithm settings, we set the maximum number of iterations at 300 through the path weighting scheme, with a stop criterion of 10^{-7} . In terms of bootstrapping, we used 10,000 subsamples to obtain stability of estimates. We selected confidence interval methods, namely bias-corrected and accelerated (BCa) bootstrapping. In addition, the level of significance we used to reject the null hypothesis was set at 5% (one-tailed). The results of the descriptive statistics for each indicator in the model are depicted in Tables 3 and 4.

4.1. Measurement model evaluation

Before we discuss the empirical findings of our hypothesis testing, it is pertinent to evaluate the measurement model and ensure that the indicators we used are valid and reliable. Drawing on standard evaluation guidelines (Latan, 2018; Benitez *et al.*, 2020), we used several core metrics that are commonly used in PLS to report the assessment of the measurement model, which includes convergent validity, discriminant validity and internal consistency reliability. Based on Tables 3 and 4, we obtained factor loading values for each indicator of the construct, which met the threshold value of > 0.708 and average variance extracted (AVE) of > 0.50 (Hair *et al.*, 2017; Latan and Noonan, 2017). Only a few construct indicators (i.e., items of EMA) yielded values slightly below this threshold, which is, however, acceptable according to extant guidelines (Hair *et al.*, 2017) to strengthen content validity (see Figure 2). From these results, we conclude that our respondents understand the definition of the concepts being measured and that their answers converge to reflect the true

situation. We further assessed internal consistency reliability using Cronbach's alpha (α) and Dijkstra-Henseler's ρ_A tests. The threshold values for Cronbach's alpha (α) and ρ_A are recommended to be > 0.70 . We obtained values above 0.85 for both measures for all constructs in the model (see Table 3 and 4), thus meeting this threshold value.

***** PLEASE INSERT TABLE 3 HERE *****

***** PLEASE INSERT TABLE 4 HERE *****

Finally, we used the heterotrait-monotrait (HTMT) ratio to evaluate discriminant validity in our PLS model, which is considered to outperform other traditional approaches (e.g., Fornell-Larcker criterion). The threshold for HTMT values of > 0.90 indicates conceptually similar constructs, while HTMT values < 0.85 indicate conceptually different constructs (Henseler, 2021; Nunnally and Bernstein, 1994). From Table 5, we can conclude that discriminant validity is fulfilled for our data.

***** PLEASE INSERT TABLE 5 HERE*****

4.2. Structural model evaluation

After evaluating the measurement model, the second step was to assess the structural model. We assessed several core metrics, including coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2) and variance inflation factor (VIF). In addition, we assessed our model's out-of-sample predictive power by conducting the PLS predict procedure (Benitez *et al.*, 2020; Latan, 2018).

*****PLEASE INSERT FIGURE 2 HERE*****

***** PLEASE INSERT TABLE 6 HERE *****

We obtained both R^2 and adj. R^2 values as depicted in Table 6 for CFP, CSP, and CEP, which range from 0.259–0.686. According to Hair *et al.* (2017), these values are included in the weak to moderate category. The predictors in our model produced effect size (f^2) values ranging from 0.093–0.792 (i.e., included in the small and large categories), which show the respective contributions of variance in the model. We also assessed the predictive relevance of our model (Q^2). Values of Q^2 larger than zero are considered meaningful. Our model produced Q^2 values ranging from 0.118–0.471, depicting small and medium levels of predictive relevance of the PLS model. We obtained VIF values for each predictor in the

model of < 3.3 , which indicates no high correlation or collinearity between predictor variables in our cases.

Finally, we assessed the model's out-of-sample predictive power by conducting the PLS predict procedure to generate holdout sample-based point predictions for the constructs in our model. Because our sample size meets minimum requirements and is in the medium size category, we used ten folds and ten replications, comparing the root mean squared error (RMSE) values from the PLS-PM analysis with those generated by a naive linear benchmark (Hair *et al.*, 2017). The results of our analysis indicate that PLS-PM yields lower prediction errors than the naive benchmark for all the indicators related to CFP, CSP, CEP and EMA, offering clear support for our model's predictive power. In addition, $Q^2_{predict}$ values > 0 for all indicators suggest that our model outperforms the most naïve benchmark.

4.3 Hypothesis testing and empirical findings – direct effects

At this stage, we tested our hypotheses simultaneously through the bootstrapping procedure; a report of our empirical findings is depicted in Table 7. Overall, our data and analysis support all the direct hypotheses we proposed. First, we found the relationships between CFP → CEP, CFP → CSP and CSP → CEP to be significant, with beta (β) values of 0.387, 0.665 and 0.236, respectively, and significance at $p = < 0.01$ at 95% CI. Hence, our empirical findings support H1, H2a and H2b. Additionally, we found the relationships between CFP → EMA and EMA → CEP to be fully supported. Specifically, we found beta (β) values of 0.509 and 0.362, respectively, with significance at $p = < 0.01$ at 95% CI. Hence, our empirical findings support H3a and H3b.

***** PLEASE INSERT TABLE 7 HERE *****

4.4 Hypothesis testing and empirical findings – indirect effects

In addition to testing the direct effects, we also tested the indirect effects to show the role of mediating variables in the relationship between CFP and CEP. Following the guidelines provided by Hayes (2018), we used two main steps to assess the specific indirect effects for multiple mediation analysis, namely determining the significance of indirect effects and their magnitude and determining the type of effect and/or mediation (Vanderweele, 2015). First, we tested the simple cause-effect relationship model (i.e., the model without the mediation variables). Second, we tested the general mediation model (i.e., the model

including the mediation variables), evaluated the level of significance and compared the R^2 value of the two models. The results of this indirect effect testing are depicted in Table 8.

***** PLEASE INSERT TABLE 8 HERE *****

As shown in Table 8, we found the results to be as expected, with CSP and EMA acting as mediators in the relationship between CFP and CEP. In particular, we found that the relationships between $CFP \rightarrow CSP \rightarrow CEP$ and $CFP \rightarrow EMA \rightarrow CEP$ were significant, with beta (β) values of 0.157 and 0.182, respectively, and significance at $p = < 0.05$ at 95% CI. Given that all the paths we found were significant and positive, this can also be referred to as complementary partial mediation. Hence, our empirical findings support H4a and H4b. Finally, we calculated variance accounted for (VAF) and the difference of R^2 to assess the magnitude of the role of each mediating variable (see Table 8). We found that the difference in R^2 between the model without mediation and the model with mediation ranged from $0.063 - 0.122 > 0.05$, with VAF values of $0.224 - 0.235 < 0.08$, which can be considered moderately substantial for mediation analysis (Hayes, 2018; Vanderweele, 2015).

4.5 Robustness tests

We ran a series of complementary tests to ensure the robustness of our main results (Latan, 2018; Lopes de Sousa Jabbour *et al.*, 2020). We tested for endogeneity bias, unobserved heterogeneity and the potential of non-linear effects between variables. We tested endogeneity bias to assess the effect of omitted variables, reverse causality and other potential errors (e.g., sample-selection bias). Heckman's test was conducted using a two-step procedure. Our results, presented in Table 9, indicate that there is no endogeneity bias present in our data or models.

***** PLEASE INSERT TABLE 9 HERE *****

Furthermore, we also examined non-linear relationships between variables (Pierce and Aguinis, 2013), an area which has recently attracted the attention of scholars (Latan *et al.*, 2018b; Trumpp and Guenther, 2017), in order to fulfill the linearity assumptions of our model. We ran the Ramsey's regression specification error test (RESET) and quadratic functions in SmartPLS. As depicted in Table 10, Ramsey's RESET test gave results of $p > 0.05$, which supports the assumption of linearity for our model.

***** PLEASE INSERT TABLE 10 HERE *****

Finally, we assessed unobserved heterogeneity to strengthen the robustness of our results. This bias usually occurs during sample selection. We used Finite Mixture PLS (FIMIX-PLS) to test this bias. After performing multi-method procedures (Sarstedt *et al.*, 2017), we found that FIMIX-PLS gave a final result of $k = 1$, which indicates that our data is free from this bias.

5. Discussion and Implications for Theory and Practice

The TBL approach has been discussed among scholars in various fields, and has been recognized as a way for firms to achieve competitive advantage (Elkington, 2004; S  n  chal, 2017; Svensson and Wagner, 2015). As the relationships between the elements of TBL are a controversy that has been constantly debated in the sustainability literature, research that examines the relationships between TBL elements in a single comprehensive model is necessary (Svensson *et al.*, 2016). Our study bridges this gap by testing the relationships between elements of TBL while considering EMA as a mediating factor, and provides new empirical evidence for the Indonesian context. Our main findings can be summarized as follows.

First, we found direct relationships between the TBL elements – CFP and CEP, CFP and CSP, and CSP and CEP (Dos Santos *et al.*, 2014; H  gevold *et al.*, 2019; Svensson *et al.*, 2016). That is, the higher the CFP of a firm, the more likely it is to pursue sustainable performance (in our case CEP and CSP). We found that improvements in operational finance and cost efficiency are the most crucial elements in influencing the CEP and CSP of firms in Indonesia. Thus, firms may allocate a certain amount of their resources to make sustainable investments, which will in turn affect their CEP and CSP. As Elkington (2004) argues, this sustainable investment will provide added value, not only in terms of economic aspects, but also for the environmental and social aspects. In addition, by adopting environmentally friendly technologies, making R&D related to the environment, creating social programs, etc., this will lead to an increase in firms’ CEP. Our results corroborate previous studies conducted by Svensson *et al.* (2018) and Laurell *et al.* (2019) related to the TBL model. In addition, our findings are in line with the propositions and strategies formulated in the NRBV and SRBV theories.

Second, we found evidence of the important roles played by EMA and CSP in mediating the relationship between CFP and CEP. In addition, we also found a direct relationship between CFP and EMA, and between EMA and CEP. Our test results indicate that both EMA and CSP act as partial mediators. We argue that EMA helps companies by

providing information that is useful for managers' decision-making, concerning both monetary and non-monetary information. As Adams *et al.* (2004) argue, EMA plays an important role in the relationship between the elements of TBL, and it is considered a managerial tool that helps in corporate decision making. We found that the role of EMA, related to the identification of environment-related costs and the allocation of environment-related costs to production processes, was the most prominent in this study. Hence, EMA acts as an intermediary in the relationship between CFP and CEP. On the other hand, CSP is expected to mediate the relationship between CFP and CEP, because by increasing CSP, CEP will be indirectly affected. We found that CSP related to social activities (such as corporate social responsibility (CSR)) can have a positive effect on CEP. Some scholars, for example Skouloudis *et al.* (2015) and Halkos and Skouloudis (2016), have shown the positive effect of CSR in building a firm's reputation. This result supports the findings of previous studies that have identified the roles of EMA and CSP in mediating the relationship between CFP and CEP (Burritt *et al.*, 2019; Ferreira *et al.*, 2010; Solovida and Latan, 2017; Svensson *et al.*, 2018; Laurell *et al.*, 2019).

Our research provides a number of theoretical and practical implications as follows. In terms of theoretical implications, our findings add new evidence to the sustainable literature, mainly because this is one of the first studies to examine the elements of TBL in a single comprehensive model for the Indonesian context, and also to consider EMA as a mediator. In addition, our findings reconcile mixed results that have previously been tested separately regarding the relationships between TBL elements, and show the role of the third variable that works to mediate these relationships (Dixon-Fowler *et al.*, 2013; Grewatsch and Kleindienst, 2017; Albertini, 2013). While previous works have found inconclusive results among TBL elements (Dos Santos *et al.*, 2014; Laurell *et al.*, 2019; Svensson *et al.*, 2016), our results indicate that EMA can help firms provide information that is useful for decision-making related to achieving shared TBL value creation. Finally, our research provides new insights into the development of the SRBV theory (Tate and Bals, 2018), where the missing element in the TBL approach can be found. In this context, CSP can be considered to support the achievement of sustainable performance.

In terms of practical implications, our findings offer the following contributions. It is worthwhile to invest in corporate sustainability, because this approach can result in simultaneous improvement to economic, environmental, and social performance, since these elements are in fact integrated (Elkington, 2004). In addition, the possession of EMA

management tools is necessary to enhance the relationships between CFP and CEP (Adams *et al.*, 2004). Furthermore, CSP seems to be an important bond between CFP and CEP, meaning that the social element of TBL is necessary to achieve a truly competitive performance. A focus on social activities such as CSR (Skouloudis *et al.*, 2015) might also add value to the economic and environmental aspects of the firm.

6. Conclusions, Limitations and Future Research Directions

This paper discusses the elements of TBL while considering EMA as a mediating variable. The TBL elements tested are CFP, CSP and CEP. All research hypotheses were confirmed, which suggests that the proposed research model is suitable for understanding the relationship between TBL elements and the role of EMA in the context of corporate environmental management in Indonesia, which adds to a broader perspective on the current debate in the field, in the context of sustainability. The main findings of this study indicate that the elements of TBL are integrated with each other and provide added value for all aspects. Therefore, investing in sustainability provides a way for companies to stay afloat and achieve competitive advantage in the current uncertain environment.

Our study has several limitations, which can be noted as follows. First, the sample size used in this study is relatively small and measurements were only taken from the sample in one time period. Furthermore, many respondents still consider information about CFP, CSP and CEP to be confidential to their firm. In addition, a one-year time period for data collection may not be enough to claim causality between variables (Henri *et al.*, 2017). Second, our main findings may not be generalizable to other countries. Svensson *et al.* (2018) indicate that there may be differences in terms of the TBL model between G20 and non-G20 countries. Finally, our results only support the role of the third variable as an indirect effect on the relationships between TBL elements. Recently, there has been a call for further research to examine the relationships between TBL elements by considering the role of moderating variables (Dixon-Fowler *et al.*, 2013; Grewatsch and Kleindienst, 2017).

We suggest the following directions for future research. First, future studies might consider the role of moderating variables in influencing the relationships between TBL elements. For example, the effects of firm characteristics (Grewatsch and Kleindienst, 2017) may provide new insights into the TBL literature. In addition, considering the role of antecedent variables in supporting the relationships between TBL elements, such as environmental committees (Dixon-Fowler *et al.*, 2017) and institutional and stakeholder pressures (Hamdoun, 2020) is an area which may prove fruitful for further investigation.

Second, we propose a research call to replicate this study in other country contexts. For example, using the CSR score list from Halkos and Skouloudis (2016), it might be useful to make a comparative study between countries. Finally, we encourage future research using a mixed methods approach to investigate the relationships between TBL elements. Based on our best knowledge, no previous study has used this approach in investigating the TBL model (Orlitzky *et al.*, 2017), in which most studies focus on only one stream, such as quantitative (Svensson *et al.*, 2018) or qualitative (Høgevold *et al.*, 2019).

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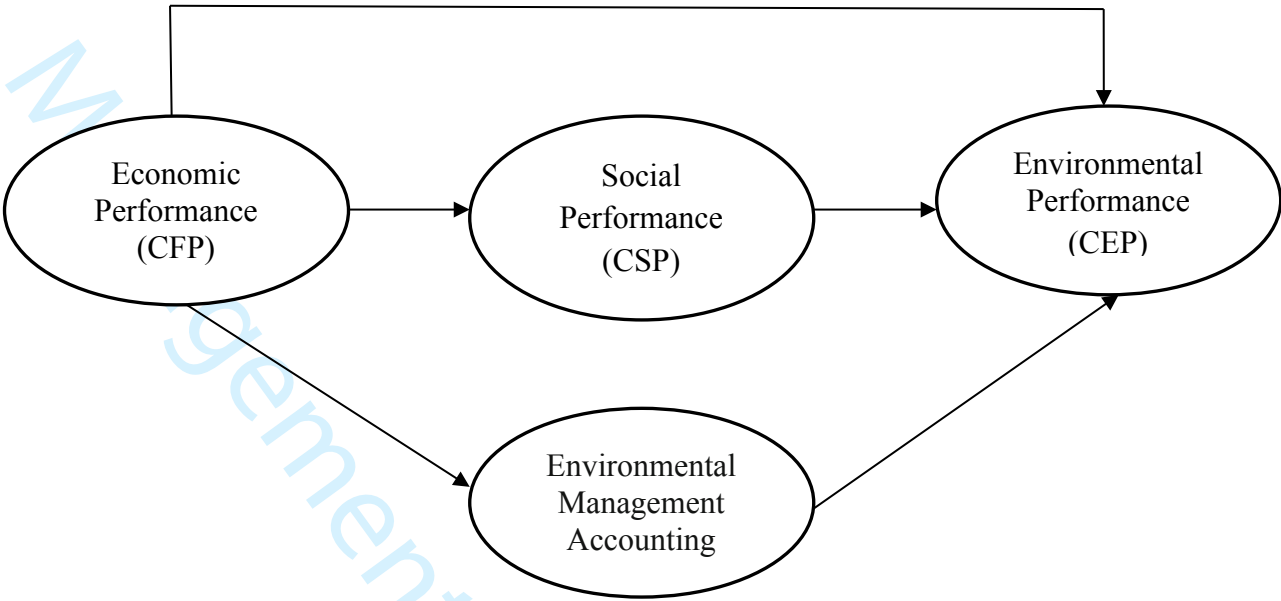


Fig 1. Theoretical framework depicting the relationships between variables

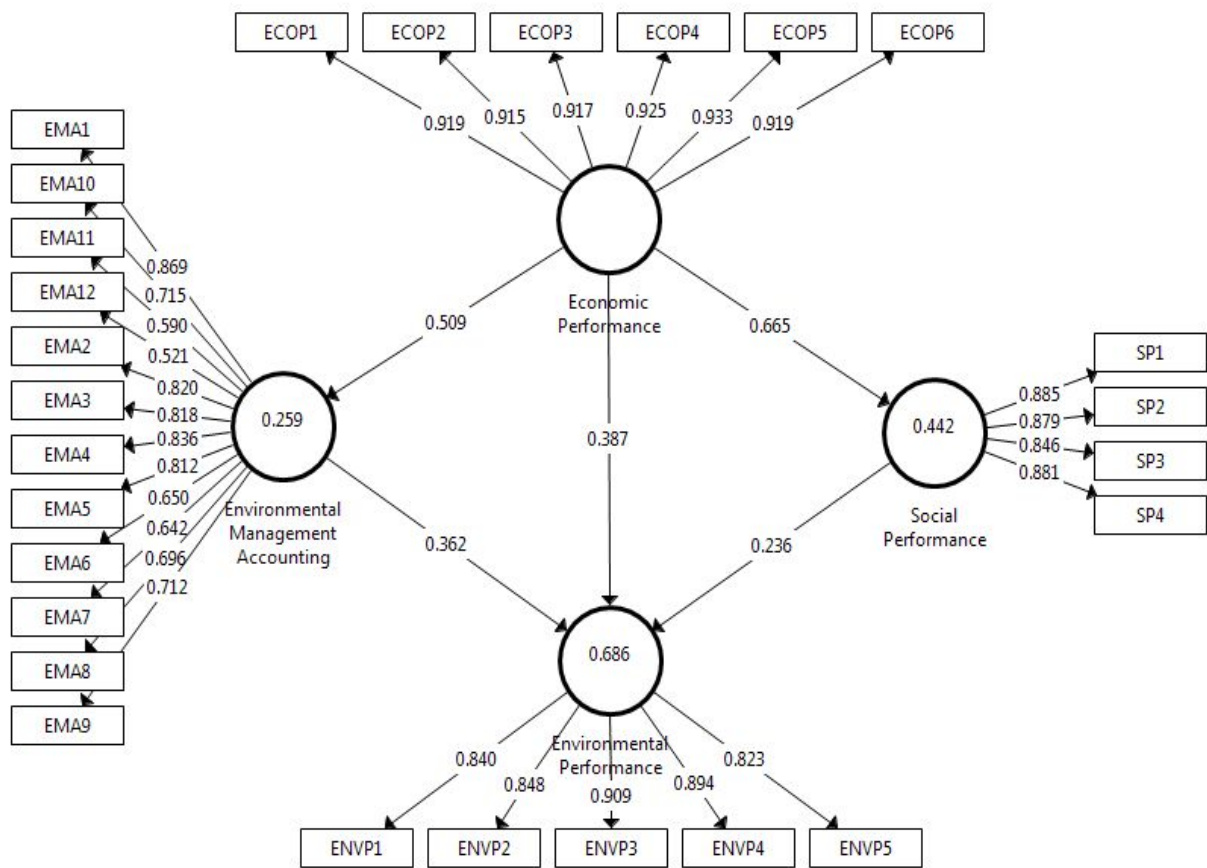


Fig 2. Evaluation of the measurement and structural models

Table 1
Assessment of Non-Response Bias

Construct	Sig. Levene's Test	Sig. t-test for Equality of Means
Economic Performance (CFP)	0.102	0.447
Social Performance (CSP)	0.533	0.611
Environmental Management Accounting (EMA)	0.086	0.504
Environmental Performance (CEP)	0.063	0.995

Table 2
Profile of Firms

Category	Frequency	Percentage (%)
No. of Employees		
<250	8	9.20
250 – 500	12	13.79
501 – 1000	17	19.54
1001 – 2500	36	41.38
2501 – 5000	9	10.34
>5000	5	5.74
Sales Volume		
< 50 billion IDR	9	10.34
51 – 70 billion IDR	15	17.24
71 – 100 billion IDR	23	26.44
101 – 200 billion IDR	28	32.18
> 200 billion IDR	12	13.79
Industry		
Food and beverages	26	29.89
Textile	7	8.04
Paper	6	6.90
Chemical	12	13.79
Metal products	16	18.39
Automotive	3	3.45
Machinery and equipment	8	9.19
Oil and gas	14	16.09
Other manufacturing	5	5.75

Table 3

Measurement Model Assessment of Economic, Social and Environmental Performance

Indicator/Item	Code	Mean	S.D	FL ^a	AVE	α	ρ_A
A) Economic Performance (CFP)					0.849	0.964	0.966
Our sustainable business practices:							
Improved cost efficiency	ECOP1	5.736	1.045	0.919			
Created a competitive advantage for the company	ECOP2	5.759	0.970	0.915			
Enhanced the company's image in the market	ECOP3	5.690	1.043	0.917			
Contributed positively to other aspects of the company's business operations	ECOP4	5.678	1.045	0.925			
Improved operational finances	ECOP5	5.770	0.979	0.933			
Generated financial benefits for the company	ECOP6	5.678	1.119	0.919			
B) Social Performance (CSP)					0.762	0.896	0.897
Our sustainable business practices:							
Positively impacted 'word-of-mouth' about the company	SP1	5.839	1.123	0.885			
Appreciated by all stakeholders	SP2	5.667	1.002	0.879			
Considered the social well-being of society as a whole	SP3	5.644	0.934	0.846			
Focused on social (i.e. relational or societal) aspects	SP4	5.586	0.941	0.881			
C) Environmental Performance (CEP)					0.745	0.914	0.917
Our sustainable business practices:							
Focused on environmental issues	ENVP1	5.724	0.854	0.840			
Diminished the corporate impact on the natural environment	ENVP2	5.529	0.856	0.848			
Considered the effects of corporate business operations on global warming	ENVP3	5.897	0.983	0.909			
Highlighted each product's footprint on the natural environment	ENVP4	5.920	1.008	0.894			
Addressed activities related to the environmental impact of products	ENVP5	5.724	0.979	0.823			

Note: ^aFL is factor loading; S.D. is standard deviation; AVE = Average variance extracted; α = Cronbach's Alpha; ρ_A = Dijkstra-Henseler's rho_A.

Table 4

Measurement Model Assessment of Environmental Management Accounting

Indicator/Item	Code	Mean	S.D	FL ^a	AVE	α	ρ_A
A) Environmental Management Accounting(EMA)					0.534	0.920	0.935
Please indicate the extent to which your company has done each of the following in the past three years:							
Identification of environment-related costs	EMA1	5.655	1.112	0.869			
Estimation of environment-related contingent liabilities	EMA2	5.540	1.112	0.820			
Classification of environment-related costs	EMA3	5.632	1.095	0.818			
Allocation of environment-related costs to production processes	EMA4	5.678	1.088	0.836			
Allocation of environment-related costs to products	EMA5	5.632	1.052	0.812			
Introduction or improvement of environment-related cost management	EMA6	5.425	0.853	0.650			
Creation and use of environment-related cost accounts	EMA7	5.391	0.987	0.642			
Development and use of environment-related key performance indicators (KPIs)	EMA8	5.322	0.903	0.696			
Product life-cycle cost assessments	EMA9	5.276	0.967	0.712			
Product inventory analyses	EMA10	5.322	0.977	0.715			
Product impact analyses	EMA11	5.310	0.986	0.590			
Product improvement analyses	EMA12	5.299	0.924	0.521			

Note:^aFL is factor loading; S.D. is standard deviation; AVE = Average variance extracted; α = Cronbach's Alpha; ρ_A = Dijkstra-Henseler's rho_A.

Table 5

Assessment of Discriminant Validity using the HTMT Test

Construct	1	2	3	4
CFP	(0.900)			
EMA	0.499[0.344;657]	(0.900)		
CEP	0.774[0.664;816]	0.714[0.599;811]	(0.900)	
CSP	0.711[0.568;829]	0.535[0.382;679]	0.744[0.603;818]	(0.900)

Note: brackets show the lower and upper bounds of the 95% BCa confidence intervals.

Table 6

Structural Model Assessment

Construct	R ²	Adj. R ²	f ²	Q ²	VIF	AFVIF
Economic Performance (CFP)	–	–	0.246 – 0.792	–	1.940	2.393
Social Performance (CSP)	0.442	0.436	0.290	0.314	1.909	2.082
Environmental Management Accounting (EMA)	0.259	0.251	0.093	0.118	1.438	1.749
Environmental Performance (CEP)	0.686	0.674	–	0.471	–	3.100

Table 7

Testing of Hypotheses (Direct Effect)

Structural path	Coef(β)	S.D.	p value	95% BCa CI	Conclusion
CFP → CEP	0.387	0.100	0.000**	(0.559, 0.005)**	H1 supported
CFP → CSP	0.665	0.073	0.000**	(0.763, 0.001)**	H2a supported
CSP → CEP	0.236	0.098	0.009**	(0.400, 0.005)**	H2b supported
CFP → EMA	0.509	0.089	0.000**	(0.637, 0.009)**	H3a supported
EMA → CEP	0.362	0.082	0.000**	(0.493, 0.001)**	H3b supported

Note: **, *statistically significant at the 1 percent and 5 percent levels, respectively.

Table 8.

Testing of Hypotheses (Indirect Effect)

Structural path	Coef (β)	S.D.	p value	95% BCa CI	Conclusion
CFP → CSP → CEP	0.157	0.072	0.015*	(0.289, 0.005)**	H4a supported
CFP → EMA → CEP	0.184	0.046	0.000**	(0.269, 0.000)**	H4b supported
Direct effect	Coef (β)	R ²	$a \times b / a \times b + c$	VAF	Conclusion
<i>c</i>	0.731	0.534	–	–	Partial mediation
<i>a</i> ₁	0.510	–	0.211 / 0.942	22.40%	
<i>b</i> ₁	0.413	0.656	–	–	
<i>a</i> ₂	0.666	–	0.225 / 0.956	23.53%	Partial mediation
<i>b</i> ₂	0.338	0.597	–	–	

Note: **, *statistically significant at the 1 percent and 5 percent levels, respectively; *c* is simple cause-effect, *a* and *b* are general mediation model.

Table 9.**Assessment of Endogeneity Bias using the Heckman Test**

Test	Coef (β)	<i>p</i> value	<i>z</i>	Conclusion
CFP → CEP (Selection DV = CSP; IV = EMA)	0.514	0.000**	9.85**	Not present
CFP → CSP (Selection DV = CEP; IV = EMA)	0.406	0.000**	8.29**	Not present
CSP → CEP (Selection DV = EMA; IV = CFP)	0.775	0.000**	8.43**	Not present
CFP → EMA (Selection DV = CEP; IV = CSP)	0.745	0.000**	5.12**	Not present
EMA → CEP (Selection DV = CSP; IV = CFP)	0.303	0.000**	8.23**	Not present

Note: DV is dependent variables, IV is independent variables **, *statistically significant at the 1 percent and 5 percent levels, respectively.

Table 10.**Assessment of Nonlinear Effects**

Structural path	Coef (β)	<i>p</i> value	f^2	Ramsey's RESET
CFP*CFP → CSP	-0.173	0.073	0.042	$F(2.261) = 0.42, p = 0.313$
CFP*CFP → CEP	0.192	0.092	0.034	
CFP*CFP → EMA	0.286	0.100	0.089	
CSP*CSP → CEP	-0.123	0.066	0.047	$F(1.864) = 0.78, p = 0.695$
EMA*EMA → CEP	0.147	0.109	0.015	

Note: **, *statistically significant at the 1 percent and 5 percent levels, respectively.



Achieving Triple Bottom Line Performance: Highlighting the Role of Social Capabilities and Environmental Management Accounting

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MEQ-09-2020-0202.R3 (Minor Revision)

Dear Respected Editor, Professor Malin Song
Management of Environmental Quality: An International Journal

Subject: Submission of revised MEQ-09-2020-0202.R3

First of all, the authors of this submission hope that you are well, safe and healthy during this challenging time.

We are excited to have been given the opportunity to further improve our manuscript and to have this manuscript published in the MEQ. Thank you very much indeed for handling this submission!

We have carefully addressed your minor comments given into this new version of our manuscript. Please kindly consider the improved version of the paper included here, following these minor comments.

In the following section, we offer detailed responses for your previous comments given.

Yours sincerely,

The author(s)

Table of Actions – MEQ R4

Editor's Comments	Authors' Comments
Please get the article down to 9000 words in total (it's currently 9,221+12*280= 12,581 words, 2 figures and 10 tables). Articles should be between 7000 and 9000 words in length. This includes all text including abstract, figures, tables, references and appendices (280 words for each figure or table).	Dear Editor, We would like to thank you very much for these minor comments. We have amended the manuscript to address your concern. Many thanks and all the best! Regarding the word length, we quite surprised if you used the 280 words rule for each table and figure. This calculation is really very rough in our opinion. We have never seen a rule like this in any journal. We recalculated the number of words in our Tables and Figures and it is actually not more than 1,000 words. Meanwhile, using your calculation, it's around 3,000+ for tables and figures only. Because we respect the rules of this journal, we have removed a number of tables and figures, which we think are reflected in the main text. We have also removed some unnecessary paragraphs from the main text. Therefore, the current paper version is less than 9000 words, including all other files (i.e., tables, figures, abstract, references, appendices etc.).

Achieving Triple Bottom Line Performance: Highlighting the Role of Social Capabilities and Environmental Management Accounting

Abstract

Purpose – The relationship between the elements of the Triple Bottom Line (TBL) is a controversial area that is constantly debated in the sustainability literature. Our study addresses this debate by testing the relationships between these elements, while considering Environmental Management Accounting (EMA) as a mediating influence.

Design/methodology/approach – This paper examines survey responses from upper-level managers from ISO 14001-certified manufacturing companies listed on the Indonesian Stock Exchange. The hypotheses were tested using a partial least squares approach and bias-corrected and accelerated bootstrap confidence intervals to test the significance of the relationships between variables.

Findings – We found a direct relationship between the TBL elements and the role of EMA and social performance in mediating the relationship between economic performance and environmental performance.

Research limitations/implications – Our research also provides new insights into the progress of the Social Resource Based View theory, where the social element missing from the TBL approach can be found.

Practical implications – The findings of this article imply that it is worthwhile to invest in corporate sustainability, because it is thereby possible to simultaneously achieve economic, environmental and social performance, since such elements are truly integrated. In addition, possession of EMA management tools is necessary to enhance the relationships between economic performance and environmental performance. Furthermore, social performance seems to constitute an important bond between both of these, indicating that the social element of the TBL is necessary to achieve truly competitive performance.

Originality/value – This study contributes to the corporate environmental management literature by providing empirical evidence regarding the TBL elements.

Keywords Corporate Sustainability, Triple Bottom Line, Environmental Management Accounting, Corporate Environmental Performance and ISO 14001.

Paper type Research paper

1. Introduction

In the past decade, research topics within the fields of sustainability, cleaner production and environmental issues have been discussed extensively among scholars in various disciplines (Chiappetta Jabbour *et al.*, 2010; Høgevold *et al.*, 2019; Laurell *et al.*, 2019; Orlitzky *et al.*, 2017; Sénéchal, 2017; Solovida and Latan, 2017; Wang and Sarkis, 2017). In particular, the concept of the ‘triple bottom line’ (TBL) has become an established theoretical blueprint (Elkington, 1998). The concepts involved in the TBL focus firms not just on the economic value that they add, but also on the environmental and social value that they add (Elkington, 2004). This framework has been widely adopted and has led to transformation among firms in engaging with sustainable investment (Dos Santos *et al.*, 2014; Høgevold *et al.*, 2019). However, to date, little is known about the relationships between the elements which make up the TBL, and there is a lack of empirical studies addressing this topic as a whole (Svensson *et al.*, 2018).

Specifically, rather than thoroughly analyzing the relationships between the TBL elements, previous studies have predominantly tested the elements of TBL separately. For example, most research has devoted its attention to the relationship between corporate financial performance (CFP) and corporate environmental performance (CEP) (Albertini, 2013; Latan *et al.*, 2018b; Trumpp and Guenther, 2017; Wagner, 2015), providing mixed results. Such research ignores social performance as the third element of TBL (Cegarra-Navarro *et al.*, 2016; Ullmann, 1985). On the other hand, some studies have also focused on the relationship between corporate social responsibility (CSR) and financial performance, without achieving conclusive results (Brammer and Millington, 2008; Beurden and Gossling, 2008; Orlitzky *et al.*, 2003; Waddock and Graves, 1997). Meanwhile, TBL assumes that its three pillars – economic, environmental and social – are interconnected and must be integrated in order to achieve competitive advantage (Elkington, 2004). Because there is no general consensus on the relationships between the elements of TBL, and because there is a lack of studies that provide concrete evidence on TBL, there is an urgent demand to re-examine these relationships in a single model (Svensson *et al.*, 2016; Laurell *et al.*, 2019).

This article aims to fill this persistent gap by testing the elements of TBL in a single model using ISO 14001-certified manufacturing companies listed on the Indonesian Stock Exchange (IDX). In addition, we also analyse environmental management accounting (EMA) as a mediator in the relationships between TBL elements (Burritt *et al.*, 2009; Christ *et al.*, 2016; Jasch, 2006). We argue that EMA plays an important role in bridging the

relationships between TBL elements, by providing information that is useful to managers' decision making.

EMA can be understood as a set of management tools that allows companies to improve their CFP, CEP and CSP by providing monetary information, such as costs and revenue, as well as non-monetary information such as energy, water and material usage or carbon dioxide emissions (Jasch, 2006; Christ and Burritt, 2013). Several previous studies have indicated that EMA is a useful instrument for improving CEP (Ferreira *et al.*, 2010; Solovida and Latan, 2017) in relation to providing information for companies (Burritt and Saka, 2006; Burritt *et al.*, 2019; Chiappetta Jabbour *et al.*, 2013).

We tested our model and collected data in Indonesia, a country with one of the largest levels of economic growth in the world, and part of the G20. Indonesia is predicted to become the fourth strongest economy in the world in 2045, according to research conducted by PricewaterhouseCoopers (PwC) in 2017. In addition, Indonesia offers an interesting phenomenon in terms of the TBL model, with previous studies reporting a lack of CEP in firms operating in Indonesia (Burritt *et al.*, 2019; Latan *et al.*, 2018a). According to the United Nations Environment Program (UNEP) report in 2018, Asia-Pacific is the fastest-growing region in the world. This economic boom has lifted many out of poverty, but it has also caused significant environmental degradation, with negative effects on human wellbeing. Because of these important issues in Indonesia, research specific to the Indonesian context has become an urgent demand.

Our study extends the state-of-the-art research in the field of sustainability and environmental management and provides original evidence in three ways. First, we answer the research call from Svensson *et al.* (2016) to test the elements of TBL in a single comprehensive model. Our study is the first to address these gaps by providing original evidence on the relationships between TBL elements in a single comprehensive model. Second, our research provides new insights into the development of the Social Resource Based View (SRBV) theory (Tate and Bals, 2018), which includes the social element missing from the TBL approach. While a plethora of emerging research studies has dealt separately with the relationships between CFP and CEP, as well as CSR and CFP, their results remain at times unclear and contradictory (Beurden and Gossling, 2008; Dixon-Fowler *et al.*, 2013; Orlitzky *et al.*, 2003). Finally, our research contributes fresh empirical evidence in the context of developing countries – in this case, Indonesia.

The remainder of this paper is organized as follows. The next section presents the theoretical background and development of hypotheses, followed by the research methodology. Subsequently, we present our empirical results. Finally, we discuss these results and provide implications that may be useful for both academics and practitioners.

2. Theoretical Background and Development of Hypotheses

2.1. The natural resource-based view (NRBV) and sustainability

One of the main sustainability theories supporting the relationship between CFP and CEP is the natural resource-based view (NRBV) (Hart, 1995; Hart and Dowell, 2011). The NRBV is an extension of the resource-based view (RBV), which focuses not only on CFP, but also on sustainable development, including CEP. The basic assumption of the RBV is that the basis of competitive advantage lies in the application of each firm's unique combination of valuable resources and capabilities to improve efficiency and business performance (Barney, 1991; Newbert, 2007). This implies that only firms that can use resources effectively and have the ability to innovate will gain competitive advantage and, therefore, achieve superior performance. Sustainable competitive advantage is determined based on the firm's ability to reconfigure its valuable and idiosyncratic resources. According to the RBV, these resources should be inimitable, rare and non-tradable (Barney, 1991; Hart, 1995; Russo and Fouts, 1997).

Hart and Dowell (2011) evaluated fifteen years of the development of the RBV, based on various empirical results concerning the propositions of the RBV, and thus formulated the NRBV. These authors argue that the RBV does not consider CEP, while environmental and sustainability issues have in recently years become widely discussed topics. Therefore, the RBV was revisited. Building on the logic of the RBV, the NRBV describes how firms can achieve competitive advantage by means of cost efficiency relating to environmental issues and minimizing environmental impact across the entire value chain of the firm. Specifically, the NRBV consists of three interrelated strategies: (1) pollution prevention, which focuses on minimizing waste, emissions and effluents with the aim of increasing efficiency and reducing costs; 2) product stewardship, which focuses on minimizing the entire value chain costs of products and thus expands the scope of pollution prevention; and (3) sustainable development, which focuses on sustainable growth of the firm while reducing environmental damage. Hence, the NRBV strategy emphasizes not only financial growth, but also environmental aspects (Hart and Dowell, 2011).

However, neither RBV nor NRBV take into account the social dimension of TBL, creating a persistent gap in the sustainability literature. As a result, a large number of studies use the term ‘sustainability’ but, in fact, only investigate CFP and CEP. Driven by this gap, Tate and Bals (2018) propose incorporating the social element of TBL as a complement to the propositions expressed in RBV and NRBV. Thereby, the social resource-based view (SRBV) is created, to show how social capabilities can be used to achieve competitive advantage. Tate and Bals (2018) suggest that the three elements of TBL – CFP, CEP and CSP – must be connected in order to achieve shared TBL value creation.

2.2. *The social resource-based view (SRBV) and sustainability*

Recently, Tate and Bals (2018) have proposed the social resource-based view (SRBV), which emphasizes the role of social capabilities in the achievement of competitive advantage. They argue that social performance has received too little attention in the context of business performance and sustainability. According to Tate and Bals (2018), RBV and NRBV do not capture social performance, the third element of the TBL model. This neglect is due to the RBV focusing on CFP in order to maximize profits, while the NRBV focuses on CEP for the preservation of the natural environment; neither focuses on social capabilities. Therefore, the SRBV complements RBV and NRBV by focusing more on CSP than CFP and CEP. Inspired by RBV and NRBV, SRBV uses two main strategies: 1) a mission-based approach, which focuses on maximizing social benefits while breaking even and becoming profitable in order to perpetuate the business model; and 2) stakeholder management, which focuses on maximizing support in terms of products, information and funds from a broad stakeholder base (Tate and Bals, 2018).

In this paper, we examine the relationships between the elements of the TBL model –CFP, CSP and CEP – while considering EMA as a mediator in these relationships. We test this model simultaneously and explain the relationships between these variables based on our conceptual framework and the results of previous studies, and thus derive our hypotheses. First, we hypothesize regarding the direct effects of the relationships between CFP, CSP and EMA on CEP. Second, we hypothesize regarding the indirect effects between these relationships.

2.3. The relationship between the TBL elements – economic, social and environmental performance

Topics related to social and environmental issues began to be studied around the 1970s, but interest in such issues has grown exponentially in the past decade. Nowadays, firms are not solely focused on short-term performance through reliance on CFP, but also consider sustainable performance, which depends on three dimensions: the social dimension, relating to community welfare; the environmental (or ecological) dimension, which relates to the preservation of the natural environment; and the financial dimension, aimed at cost efficiency and boosting benefits (Svensson *et al.*, 2016; Sénéchal, 2017).

In all three of RBV, NRBV and SRBV, CFP is the first pillar which supports sustainable performance. In this view, the capabilities of the firm in developing and managing a bundle of resources such as technology, design, procurement, production, distribution and service are the main keys to achieving competitive advantage (Barney, 1991; Hart, 1995; Hart and Dowell, 2011; Russo and Fouts, 1997; Tate and Bals, 2018). The goal is to achieve cost differentiation, and to gain a more advantageous position than competitors. A firm that has grown in terms of CFP will in turn pursue sustainability performance by focusing on improving CSP and CEP. By focusing on CSP and CEP, a firm will gain additional benefits and reduce costs across the entire value chain. Hence, an increase in CFP will positively influence the firm's CSP and CEP. For example, companies can adopt environmentally friendly technologies, conduct R&D to minimize environmental damage and create programs for social responsibility. All of these actions have an impact not only on cost efficiency, but also on reputation, image and organizational learning (Lankoski, 2008; Hart and Dowell, 2011; Tate and Bals, 2018).

Several previous studies have found a positive effect based on the relationships between CFP and CEP (Laurell *et al.*, 2019; Svensson *et al.*, 2018; Testa and D'Amato, 2017), CFP and CSP (Brammer and Millington, 2008; Brammer *et al.*, 2006; Waddock and Graves, 1997; Scholtens, 2008) and CSP and CEP (Orlitzky *et al.*, 2017; Garcia-Castro *et al.*, 2010; Laurell *et al.*, 2019; Svensson *et al.*, 2018). Based on the above discussion, we derive the following hypotheses:

H1: CFP has a positive and direct effect on CEP.

H2a: CFP has a positive and direct effect on CSP.

H2b: CSP has a positive and direct effect on CEP.

2.4. Indirect effects between the TBL elements through EMA

Over the past decade, the study of the relationships among the elements of TBL has had a prominent place in the sustainability literature. However, although hundreds of separate studies have been carried out and reported, inconsistent and disappointing results have provoked recent debate. This is because the relationships between the elements of TBL have continually produced mixed research results. Several meta-analytical studies have revealed that such mixed results found by scholars may be determined further by examining the role of a third variable. Meanwhile, a study conducted by Svensson *et al.* (2018) shows that the role of the third variable works well in analyzing the relationships between TBL elements. Specifically, Svensson *et al.* (2018) found that CSP mediated the relationship between CFP and CEP.

Based on the logic of NRBV and SRBV (Hart and Dowell, 2011; Tate and Bals, 2018), firms that achieve superior performance are not only able to manage CFP, but also CSP and CEP. In this situation, a firm that has excelled in CFP can directly increase its CEP by adopting environmentally friendly technologies, adopting various quality standards and developing programs related to the environment etc. for cost efficiency (Lankoski, 2008). Conversely, a firm that focuses on increasing CSP will ultimately indirectly increase its CEP as well (Garcia-Castro *et al.*, 2010; Orlitzky *et al.*, 2017; Svensson *et al.*, 2016), given that CSP and CEP are interconnected.

In addition, several scholars have indicated that EMA is an intermediary in the relationships between TBL elements (Ferreira *et al.*, 2010; Christ and Burritt, 2013; Solovida and Latan, 2017). A firm that is successful in managing CEP requires a set of tools that can provide information for decision-making. EMA offers this information, providing information related not only to monetary factors such as costs and revenue, but also non-monetary information concerning energy, water, materials or carbon dioxide emissions. Previous research conducted by Burritt *et al.* (2019), Ferreira *et al.* (2010) and Solovida and Latan (2017) indicates that EMA can mediate the relationship between CFP and CEP. Based on the above discussion, we derive the following hypotheses:

H3a: CFP has a positive and direct effect on EMA.

H3b: EMA has a positive and direct effect on CEP.

H4a: CFP has a positive and indirect effect on CEP through CSP.

H4b: CFP has a positive and indirect effect on CEP through EMA.

3. Research Method

3.1. Sample and data collection

The sample in this study is composed of upper-level managers (i.e., general managers, operations managers, financial managers and environmental managers) from ISO 14001-certified manufacturing companies listed on the Indonesian Stock Exchange (IDX). Our sampling frame was determined based on data provided by IDX (www.idx.co.id) and the Indonesian Ministry of Environment and Forestry. According to this database, in 2018 there were a total of 285 companies with ISO 14001 certification operating in Indonesia. We contacted all of these companies to ask them to participate in our survey, and received approval from 109 companies.

We conducted data collection between June and December 2018 using an online survey, as well as contacting each respondent via telephone calls and emails. We chose this method because it is considered effective for reaching a broad range of respondents at low cost (Dillman *et al.*, 2014; Groves *et al.*, 2009). In order to increase the response rate, we sent several reminder e-mails and made several phone calls to non-responders. We also guaranteed the anonymity of responses and did not disclose the identity of the companies involved. Finally, we provided a cut-off date of five months for completion of this survey for the purpose of testing non-response bias (Dillman *et al.*, 2014; Fowler Jr, 2013).

At the time of the deadline, we had received 91 returned questionnaires; four of these were excluded due to incompleteness, giving an overall response rate of 19.95%. We argue that this response is acceptable for studies in sustainability and the environment (Dubey *et al.*, 2017; Wijethilake, 2017), with some studies giving rates lower than this threshold (Christ and Burritt, 2013; Ferreira *et al.*, 2010). However, in order to ensure that there were no biases or differences between respondents and non-respondents in this survey, we tested non-response bias by comparing those who responded early and those who responded late in the survey period (Clotey and Grawe, 2014; Dalecki *et al.*, 1993). We assume for this purpose that late respondents are similar to non-respondents, in terms of time taken to reply. We used a t-test to assess differences in the means of the two sample groups. Our results did not find significant ($p > 0.05$) differences between these groups of respondents. Finally, we tested for common method bias (CMB), which is another potential source of bias when using the survey method (Siemens *et al.*, 2010). We used full collinearity VIFs (AFVIF), an approach proposed by Kock (2015) to assess CMB between the item correlations of two constructs. Our analysis

results resulted in an AFVIF value of $2.887 < 3.3$, which indicates that CMB does not occur in our measurements.

3.2. *Measurement items and scales*

In survey-based studies, measurement scales and indicators are crucial elements in order to produce unbiased estimates. We used measurement scales and indicators adopted from previous studies in the field of environment and sustainability in order to avoid scale proliferation. We consider that these indicators have been validated through the test-retest method and are well established. We used multiple indicators rather than a single indicator to measure each construct in the model, in order to capture the essence of the variables with a degree of precision that a single item could not attain (DeVellis, 2017). This method aims to reduce measurement errors and improve the validity and reliability of indicators. We measured CFP, CSP and CEP using indicators adopted from Svensson *et al.* (2016), Svensson *et al.* (2018) and Laurell *et al.* (2019). We used a 7-point Likert scale across a total of 15 items, including 6, 4 and 5 indicators to measure CFP, CSP and CEP, respectively. This scale ranges from 1 = “strongly disagree” to 7 = “strongly agree”. Subsequently, we measured EMA using indicators adopted from Ferreira *et al.* (2010) and Christ and Burritt (2013). We used a 7-point Likert scale with 12 indicators to measure this construct. This scale ranges from 1 = “does not at all” to 7 = “does to a great extent”.

3.3. *Data analysis*

The structural equation modeling (SEM) method was used to simultaneously test the relationships between unobserved variables in our model. Two SEM approaches – covariance structure analysis (CSA) and partial least squares path modeling (PLS-PM) – are available to analyze our data (Henseler, 2021; Jöreskog *et al.*, 2016). We chose PLS-PM due to some favorable considerations over CSA. First, PLS-PM is a soft modeling approach, which uses non-parametric assumptions. Hence, PLS-PM does not depend on the parametric assumptions of Maximum Likelihood (ML), such as multivariate normality or goodness-of-fit of model. In addition, PLS-PM avoids the problem of Heywood cases in our data. Second, PLS-PM has a “causal-predictive” nature and aims to predict relationships between variables, rather than testing causality to confirm theories (Hair *et al.*, 2019; Pearl *et al.*, 2016). Here, this approach allows us to strike a balance between explanation and prediction, given that our model has a relative scarcity of theory and knowledge. Finally, PLS-PM allows us to test the

specific indirect effects between latent variables and conduct a series of robustness tests (Latan, 2018). In this case, PLS offers advanced features with a user-friendly interface.

In this study, we have followed the current guidelines for reporting PLS-PM analysis, which are well-documented in the literature (Latan, 2018; Benitez *et al.*, 2020). Specifically, the three main steps which we conducted and reported are as follows. First, we assessed and evaluated the results of the measurement model. This is intended to assess the validity and reliability of construct indicators (i.e., convergent validity, discriminant validity and internal consistency reliability). Second, we assessed and evaluated the results of the structural model. This is intended to assess the overall fit of the model (i.e., r-square, effect size and predictive relevance) and test our hypotheses. Finally, we ran several series of robustness tests to ensure that our main results are not biased (i.e., endogeneity testing, unobserved heterogeneity and non-linear effects).

4. Results

We used the SmartPLS 3 software (Ringle *et al.*, 2015) to estimate the parameters of our model. The results of the descriptive statistics for each indicator in the model are depicted in Tables 1 and 2.

4.1. Measurement model evaluation

Before we discuss the empirical findings of our hypothesis testing, it is pertinent to evaluate the measurement model and ensure that the indicators we used are valid and reliable. Based on Tables 1 and 2, we obtained factor loading values for each indicator of the construct, which met the threshold value of > 0.708 and average variance extracted (AVE) of > 0.50 (Hair *et al.*, 2017; Latan and Noonan, 2017). From these results, we conclude that our respondents understand the definition of the concepts being measured and that their answers converge to reflect the true situation (see Figure 1). We further assessed internal consistency reliability using Cronbach's alpha (α) and Dijkstra-Henseler's ρ_A tests. The threshold values for Cronbach's alpha (α) and ρ_A are recommended to be > 0.70 . We obtained values above 0.85 for both measures for all constructs in the model (see Table 1 and 2), thus meeting this threshold value.

***** PLEASE INSERT TABLE 1 HERE *****

***** PLEASE INSERT TABLE 2 HERE *****

Finally, we used the heterotrait-monotrait (HTMT) ratio to evaluate discriminant validity in our PLS model, which is considered to outperform other traditional approaches (e.g., Fornell-Larcker criterion). The threshold for HTMT values of > 0.90 indicates conceptually similar constructs, while HTMT values < 0.85 indicate conceptually different constructs (Henseler, 2021; Nunnally and Bernstein, 1994). We found HTMT values < 0.90 and therefore discriminant validity was met.

4.2. Structural model evaluation

After evaluating the measurement model, the second step was to assess the structural model. We assessed several core metrics, including coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2) and variance inflation factor (VIF). In addition, we assessed our model's out-of-sample predictive power by conducting the PLS predict procedure (Benitez *et al.*, 2020; Latan, 2018).

*****PLEASE INSERT FIGURE 1 HERE*****

We obtained both R^2 and adj. R^2 values for CFP, CSP, and CEP ranging from 0.259–0.686. According to Hair *et al.* (2017), these values are included in the weak to moderate category. The predictors in our model produced effect size (f^2) values ranging from 0.093–0.792 (i.e., included in the small and large categories), which show the respective contributions of variance in the model. We also assessed the predictive relevance of our model (Q^2). Values of Q^2 larger than zero are considered meaningful. Our model produced Q^2 values ranging from 0.118–0.471, depicting small and medium levels of predictive relevance of the PLS model. Finally, we obtained VIF values for each predictor in the model of < 3.3 , which indicates no high correlation or collinearity between predictor variables in our cases.

4.3 Hypothesis testing and empirical findings – direct effects

At this stage, we tested our hypotheses simultaneously through the bootstrapping procedure. Overall, our data and analysis support all the direct hypotheses we proposed. First, we found the relationships between CFP→CEP, CFP→CSP and CSP→CEP to be significant, with beta (β) values of 0.387, 0.665 and 0.236, respectively, and significance at $p = < 0.01$ at 95% CI. Hence, our empirical findings support H1, H2a and H2b. Additionally, we found the relationships between CFP→EMA and EMA→CEP to be fully supported. Specifically, we found beta (β) values of 0.509 and 0.362, respectively, with significance at $p = < 0.01$ at 95% CI. Hence, our empirical findings support H3a and H3b.

4.4 Hypothesis testing and empirical findings – indirect effects

In addition to testing the direct effects, we also tested the indirect effects to show the role of mediating variables in the relationship between CFP and CEP. Following the guidelines provided by Hayes (2018), we used two main steps to assess the specific indirect effects for multiple mediation analysis, namely determining the significance of indirect effects and their magnitude and determining the type of effect and/or mediation (Vanderweele, 2015). First, we tested the simple cause-effect relationship model (i.e., the model without the mediation variables). Second, we tested the general mediation model (i.e., the model including the mediation variables), evaluated the level of significance and compared the R^2 value of the two models.

We found the results to be as expected, with CSP and EMA acting as mediators in the relationship between CFP and CEP. In particular, we found that the relationships between $CFP \rightarrow CSP \rightarrow CEP$ and $CFP \rightarrow EMA \rightarrow CEP$ were significant, with beta (β) values of 0.157 and 0.182, respectively, and significance at $p = < 0.05$ at 95% CI. Given that all the paths we found were significant and positive, this can also be referred to as complementary partial mediation. Hence, our empirical findings support H4a and H4b. Finally, we calculated variance accounted for (VAF) and the difference of R^2 to assess the magnitude of the role of each mediating variable. We found that the difference in R^2 between the model without mediation and the model with mediation ranged from $0.063-0.122 > 0.05$, with VAF values of $0.224-0.235 < 0.08$, which can be considered moderately substantial for mediation analysis (Hayes, 2018; Vanderweele, 2015).

4.5 Robustness tests

We ran a series of complementary tests to ensure the robustness of our main results (Latan, 2018; Lopes de Sousa Jabbour *et al.*, 2020). We tested for endogeneity bias, unobserved heterogeneity and the potential of non-linear effects between variables. We tested endogeneity bias to assess the effect of omitted variables, reverse causality and other potential errors (e.g., sample-selection bias). Heckman's test was conducted using a two-step procedure. We found no differences between the models before and after controlling for the third variable, indicate that there is no endogeneity bias present in our case.

Finally, we assessed unobserved heterogeneity to strengthen the robustness of our results. This bias usually occurs during sample selection. We used Finite Mixture PLS (FIMIX-PLS) to test this bias. After performing multi-method procedures (Sarstedt *et al.*,

2017), we found that FIMIX-PLS gave a final result of $k = 1$, which indicates that our data is free from this bias.

5. Discussion and Implications for Theory and Practice

The TBL approach has been discussed among scholars in various fields, and has been recognized as a way for firms to achieve competitive advantage (Elkington, 2004; Sénéchal, 2017; Svensson and Wagner, 2015). As the relationships between the elements of TBL are a controversy that has been constantly debated in the sustainability literature, research that examines the relationships between TBL elements in a single comprehensive model is necessary (Svensson *et al.*, 2016). Our study bridges this gap by testing the relationships between elements of TBL while considering EMA as a mediating factor, and provides new empirical evidence for the Indonesian context. Our main findings can be summarized as follows.

First, we found direct relationships between the TBL elements – CFP and CEP, CFP and CSP, and CSP and CEP (Dos Santos *et al.*, 2014; Høgevold *et al.*, 2019; Svensson *et al.*, 2016). That is, the higher the CFP of a firm, the more likely it is to pursue sustainable performance (in our case CEP and CSP). We found that improvements in operational finance and cost efficiency are the most crucial elements in influencing the CEP and CSP of firms in Indonesia. Thus, firms may allocate a certain amount of their resources to make sustainable investments, which will in turn affect their CEP and CSP. As Elkington (2004) argues, this sustainable investment will provide added value, not only in terms of economic aspects, but also for the environmental and social aspects. In addition, by adopting environmentally friendly technologies, making R&D related to the environment, creating social programs, etc., this will lead to an increase in firms' CEP. Our results corroborate previous studies conducted by Svensson *et al.* (2018) and Laurell *et al.* (2019) related to the TBL model. In addition, our findings are in line with the propositions and strategies formulated in the NRBV and SRBV theories.

Second, we found evidence of the important roles played by EMA and CSP in mediating the relationship between CFP and CEP. In addition, we also found a direct relationship between CFP and EMA, and between EMA and CEP. Our test results indicate that both EMA and CSP act as partial mediators. We argue that EMA helps companies by providing information that is useful for managers' decision-making, concerning both monetary and non-monetary information. As Adams *et al.* (2004) argue, EMA plays an important role in the relationship between the elements of TBL, and it is considered a

managerial tool that helps in corporate decision making. We found that the role of EMA, related to the identification of environment-related costs and the allocation of environment-related costs to production processes, was the most prominent in this study. Hence, EMA acts as an intermediary in the relationship between CFP and CEP. On the other hand, CSP is expected to mediate the relationship between CFP and CEP, because by increasing CSP, CEP will be indirectly affected. We found that CSP related to social activities (such as corporate social responsibility (CSR)) can have a positive effect on CEP. Some scholars, for example Skouloudis *et al.* (2015) and Halkos and Skouloudis (2016), have shown the positive effect of CSR in building a firm's reputation. This result supports the findings of previous studies that have identified the roles of EMA and CSP in mediating the relationship between CFP and CEP (Burritt *et al.*, 2019; Ferreira *et al.*, 2010; Solovida and Latan, 2017; Svensson *et al.*, 2018; Laurell *et al.*, 2019).

Our research provides a number of theoretical and practical implications as follows. In terms of theoretical implications, our findings add new evidence to the sustainable literature, mainly because this is one of the first studies to examine the elements of TBL in a single comprehensive model for the Indonesian context, and also to consider EMA as a mediator. In addition, our findings reconcile mixed results that have previously been tested separately regarding the relationships between TBL elements, and show the role of the third variable that works to mediate these relationships (Dixon-Fowler *et al.*, 2013; Grewatsch and Kleindienst, 2017; Albertini, 2013). While previous works have found inconclusive results among TBL elements (Dos Santos *et al.*, 2014; Laurell *et al.*, 2019; Svensson *et al.*, 2016), our results indicate that EMA can help firms provide information that is useful for decision-making related to achieving shared TBL value creation. Finally, our research provides new insights into the development of the SRBV theory (Tate and Bals, 2018), where the missing element in the TBL approach can be found. In this context, CSP can be considered to support the achievement of sustainable performance.

In terms of practical implications, our findings offer the following contributions. It is worthwhile to invest in corporate sustainability, because this approach can result in simultaneous improvement to economic, environmental, and social performance, since these elements are in fact integrated (Elkington, 2004). In addition, the possession of EMA management tools is necessary to enhance the relationships between CFP and CEP (Adams *et al.*, 2004). Furthermore, CSP seems to be an important bond between CFP and CEP, meaning that the social element of TBL is necessary to achieve a truly competitive performance. A

focus on social activities such as CSR (Skouloudis *et al.*, 2015) might also add value to the economic and environmental aspects of the firm.

6. Conclusions, Limitations and Future Research Directions

This paper discusses the elements of TBL while considering EMA as a mediating variable. The TBL elements tested are CFP, CSP and CEP. All research hypotheses were confirmed, which suggests that the proposed research model is suitable for understanding the relationship between TBL elements and the role of EMA in the context of corporate environmental management in Indonesia, which adds to a broader perspective on the current debate in the field, in the context of sustainability. The main findings of this study indicate that the elements of TBL are integrated with each other and provide added value for all aspects. Therefore, investing in sustainability provides a way for companies to stay afloat and achieve competitive advantage in the current uncertain environment.

Our study has several limitations, which can be noted as follows. First, the sample size used in this study is relatively small and measurements were only taken from the sample in one time period. Second, our main findings may not be generalizable to other countries. Finally, our results only support the role of the third variable as an indirect effect on the relationships between TBL elements.

We suggest the following directions for future research. First, future studies might consider the role of moderating variables in influencing the relationships between TBL elements. In addition, considering the role of antecedent variables in supporting the relationships between TBL elements, such as environmental committees (Dixon-Fowler *et al.*, 2017) and institutional and stakeholder pressures (Hamdoun, 2020) is an area which may prove fruitful for further investigation. Second, we propose a research call to replicate this study in other country contexts. For example, using the CSR score list from Halkos and Skouloudis (2016), it might be useful to make a comparative study between countries. Finally, we encourage future research using a mixed methods approach to investigate the relationships between TBL elements.

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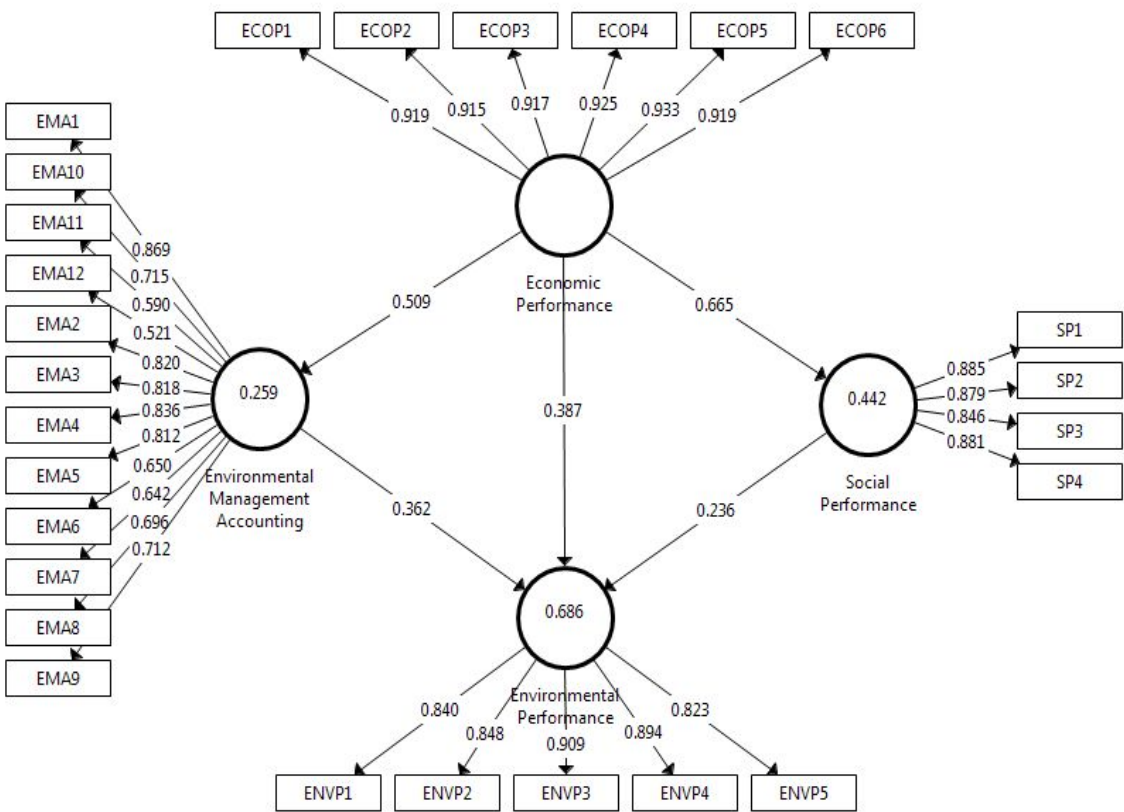


Fig 1. Evaluation of the measurement and structural models

Table 1

Measurement Model Assessment of Economic, Social and Environmental Performance

Indicator/Item	Code	Mean	S.D	FL ^a	AVE	α	ρ_A
A) Economic Performance (CFP)					0.849	0.964	0.966
Our sustainable business practices:							
Improved cost efficiency	ECOP1	5.736	1.045	0.919			
Created a competitive advantage for the company	ECOP2	5.759	0.970	0.915			
Enhanced the company's image in the market	ECOP3	5.690	1.043	0.917			
Contributed positively to other aspects of the company's business operations	ECOP4	5.678	1.045	0.925			
Improved operational finances	ECOP5	5.770	0.979	0.933			
Generated financial benefits for the company	ECOP6	5.678	1.119	0.919			
B) Social Performance (CSP)					0.762	0.896	0.897
Our sustainable business practices:							
Positively impacted 'word-of-mouth' about the company	SP1	5.839	1.123	0.885			
Appreciated by all stakeholders	SP2	5.667	1.002	0.879			
Considered the social well-being of society as a whole	SP3	5.644	0.934	0.846			
Focused on social (i.e. relational or societal) aspects	SP4	5.586	0.941	0.881			
C) Environmental Performance (CEP)					0.745	0.914	0.917
Our sustainable business practices:							
Focused on environmental issues	ENVP1	5.724	0.854	0.840			
Diminished the corporate impact on the natural environment	ENVP2	5.529	0.856	0.848			
Considered the effects of corporate business operations on global warming	ENVP3	5.897	0.983	0.909			
Highlighted each product's footprint on the natural environment	ENVP4	5.920	1.008	0.894			
Addressed activities related to the environmental impact of products	ENVP5	5.724	0.979	0.823			

Note: ^aFL is factor loading; S.D. is standard deviation; AVE = Average variance extracted; α = Cronbach's Alpha; ρ_A = Dijkstra-Henseler's rho_A.

Table 2

Measurement Model Assessment of Environmental Management Accounting

Indicator/Item	Code	Mean	S.D	FL ^a	AVE	α	ρ_A
A) Environmental Management Accounting(EMA)					0.534	0.920	0.935
Please indicate the extent to which your company has done each of the following in the past three years:							
Identification of environment-related costs	EMA1	5.655	1.112	0.869			
Estimation of environment-related contingent liabilities	EMA2	5.540	1.112	0.820			
Classification of environment-related costs	EMA3	5.632	1.095	0.818			
Allocation of environment-related costs to production processes	EMA4	5.678	1.088	0.836			
Allocation of environment-related costs to products	EMA5	5.632	1.052	0.812			
Introduction or improvement of environment-related cost management	EMA6	5.425	0.853	0.650			
Creation and use of environment-related cost accounts	EMA7	5.391	0.987	0.642			
Development and use of environment-related key performance indicators (KPIs)	EMA8	5.322	0.903	0.696			
Product life-cycle cost assessments	EMA9	5.276	0.967	0.712			
Product inventory analyses	EMA10	5.322	0.977	0.715			
Product impact analyses	EMA11	5.310	0.986	0.590			
Product improvement analyses	EMA12	5.299	0.924	0.521			

Note:^aFL is factor loading; S.D. is standard deviation; AVE = Average variance extracted; α = Cronbach's Alpha; ρ_A = Dijkstra-Henseler's rho_A.