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The Relationship Between Corporate Innovation and Corporate Governance: Empirical Evidence from Indonesia

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Abstract

The current study is at the forefront of examining the theory of principal-agent framework and financing constraints to explain the level of corporate innovation. To boost the firm's level of innovation, this study uses corporate governance and corporate performance as driving factors. The study's secondary goal is to give information on the parallel relationship between corporate governance and the level of corporate innovation. This study used a two-step least square (TSLs) regression analysis to examine such a simultaneous association using secondary data from Indonesian listed businesses from 2000 to 2021, which totaled around 1,910 observations. This study uses the Principal Component Analysis (PCA) tool to test cumulative variances of potential corporate governance indicators such as the total commissioner of the firm (TCOM), total independent commissioner of the firm (INDPCOM), the proportion of institutional ownership (INSOWN), total female commissioner (FEMCOM), CEO duality (CEODUAL), and type of the firm (SOE). As a result, PCA reveals that four of these variables, omitting CEODUAL and SOE, were a corporate governance construct. Furthermore, the study discovered that the amount of firm innovation and corporate governance are related.

Keywords: GCG, Innovation, Agency Theory, Financial Constraint

JEL Classification Code: G30, G32, M10, M20

1. Introduction

Good corporate governance (henceforth GCG) has lately emerged as a separate research subject that has piqued the interest of academics. Corporate governance is undeniably seen as a major indicator of firm performance (Hermuningsih, Kusuma, & Cahyafarida, 2020; Solikhah, Wahyudin, & Rahmayanti, 2020; Tran, Lam, & Luu, 2020). A number of prior studies have established a strong relationship between corporate governance and financial performance (Akbar et al., 2016; Chauhan et al., 2016; Di Berardino, 2016; Rose, 2016; Detthamrong et al., 2017; Pillai & Al-Malkawi, 2017; Paniagua et al., 2018). Indeed, according to Kayalvizhi and Thenmozhi (2018), excellent corporate governance contributes to a country's economic growth by encouraging foreign direct investment. Most businesses, including corporate governance, are currently facing a violent challenge, namely, the rapid growth of technology, which forces them to adapt to the betterment of their entire business line. It should be more

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adaptable in terms of learning, evolving, and responding to technological disruption. This may result in a corporate governance development that was set up as a response to the rapid development of technological advances. As a result, innovation becomes essential for companies to continue to generate significant yields in the future, through improved GCG (Mantysaari, 2012).

Although a great number of prior studies have looked into the topic of strong corporate governance, they have focused too much on how corporate governance has influenced corporate innovation (Miozzo & Dewick, 2002; Jiang & Yuan, 2018; Kayalvizhi & Thenmozhi, 2018). Previous researchers had been restricted in their exploration of how business innovation influenced corporate governance. The vast bureaucratic and hierarchical organizational structure was unsuitable for a period in which rapid dynamic turnaround was required. Given that these assertions are consistent with the prior impression of this study, where the relationship between corporate governance and company innovation is not one-sided. To put it another way, corporate innovation will inevitably change corporate governance. As a result, the current study encourages the use of a simultaneous framework to understand the link between the two variables. This study uses a two-stage least square (TSLS) regression analysis to confirm the simultaneous association.

Sena et al. (2018) and Jiang and Yuan (2018), for example, analyzed corporate governance separately through numerous indicators in light of prior studies that paid less attention to how to quantify the variable of corporate governance. As a proxy for corporate governance, they used the number of independent boards and institutional investor ownership. No such studies existed that provided a basis for deciding how to set up corporate governance. Instead of using the number of independent board members and institutional investor ownership as proxies for corporate governance, we'll use the total number of independent board members and institutional investor ownership. This study calls for a widely used corporate governance indicator to be tested in a single construct measurement. As a result, the current study uses principal component analysis, a type of factor analysis, to aid in the formulation of specific reflective indicators for constructing the corporate governance construct. It is experimentally beneficial to add to the body of knowledge in the field of corporate governance theory.

The current study makes three major contributions. To begin with, the findings of this study provide an important addition to current developments in the field of corporate innovation theory. The reciprocity model used in this study proves that excellent corporate governance isn't the only effect of corporate innovation. However, it's also important to realize that the level of business innovation has an impact on the GCG dynamic. Second, the current study confirms a commonly used corporate governance

measuring scale in a single construct development. This effort favors measurement methods in evaluating corporate governance indexes for future research. This analytical technique evaluates the convergence of the validity of each indicator as an acceptable measure for corporate governance variables by using principal component analysis. Finally, this work will have an impact in the arena of practical implications. For example, rather than focusing solely on the one-way relationship between corporate governance and corporate innovation, executives should consider how innovation affects corporate governance because companies must synchronously adjust their organizational structure to accommodate recent dynamic changes brought on by innovation activities.

2. Literature Review

2.1. Principal-Agent Framework

The principles of the principal-agent framework are based on Jensen and Meckling's agency theory. This idea asserts that a large and modern corporation has divided governance between its owners (principals) and managers (agents). It implies that the principal, as well as the agent who does not have the firm's cash flow rights, were not necessarily involved in the company's management. Managers (agents) should overstate the wealth of the shareholders, whilst the principal is concerned with the availability of finances to keep the business running. However, there has been a shift in moral hazard behavior, with managers not working for this objective as often as they used to owe to their conflict of interest. For example, suppose managers are faced with a high-risk (σ) project (r). High-risk ventures ($\sigma.r$) have implications for high levels of return (π) on the shareholder side as well. Managers, on the other hand, have a distinct perspective. To be more specific, high-risk projects have a high potential of failure for management. As a result, they frequently avoid high-risk projects due to the higher danger of contingency failure, which increases the risk of the manager's bad image. This viewpoint, however, is diametrically opposed to shareholder objectives, which always anticipate a significant future return (π).

$$f(U_{\text{manager}}) = (\text{income}, \sigma.r)$$

The pay income and project risk are the utility functions of managers, according to Equation 1. Because high-risk projects increase the likelihood of project failure and, as a result, negatively impact the managers' reputation, they should be avoided.

$$U_{\text{manager}} = (\text{income})^{-\sigma.r}$$

$$U_{\text{manager}} = \frac{1}{(\text{income})^{\sigma.r}}$$

Whereas on the perspective of the shareholder is,

$$f(U_{\text{shareholder}}) = (\pi, \sigma.r)$$

$$U_{\text{shareholder}} = (\pi)^{\sigma.r}$$

Therefore,

$$U_{\text{shareholder}} \neq U_{\text{manager}}$$

$$\frac{1}{(\text{income})^{\sigma.r}} \neq (\pi)^{\sigma.r}$$

Because the goals of the shareholder and the manager are so dissimilar, there may be a conflict between the principal (shareholder) and the agent (manager) (manager). Because it poses a threat to the entire company's success, a different approach is required to avert the dispute.

Innovation is a high-risk investment activity with a high level of uncertainty risk. It is classified as a high-risk project (Chaloti & Serfes, 2017). As previously said, if management is hesitant to take on a high-risk initiative, business innovation will be hampered (Lestari et al., 2020). If the situation persists, the company will be further left behind by its competitors. It is harmful, therefore, companies need a particular mechanism to reduce the agency conflict between the manager (agent) and shareholder (principal) (Dang, Pham, Nguyen, & Nguyen, 2020). With regards to this, several previous studies depicted that incentive (*i*) mechanism for managers could decrease the agency conflict (Belghitar & Clark, 2015; Bessonova & Gonchar, 2016; Gormley & Matsa, 2016; Poblete & Spulber, 2017). Additionally, it is widely accepted that if the conflict could be avoided, corporate innovation would be intensified (Aghion et al., 2013; Bernstein, 2015). In addition to the incentive mechanism, the monitoring (*m*) process by investors is another mechanism that can be used to avoid agency conflict. Moreover, Jiang and Yuan (2018) successfully proved that the monitoring process is an effective way to reduce the asymmetry of information between the principals and the agents. They further asserted that the monitoring process would eventually prevent a company from the occurrence of an agency conflict and encourage managers to establish innovative investment decisions.

$$U_{\text{shareholder}} \neq U_{\text{manager}}$$

Since it needs incentive (*i*) and monitoring (*m*) mechanism to reduce the difference of utility between shareholder (principal) and manager (agent), therefore

$$\left[(i) + (m) \cdot \left(\frac{1}{(\text{income})^{\sigma.r}} \right) \right] = \frac{(\pi)^{\sigma.r}}{(i) + (m)}$$

$$\frac{\left[(i) + (m) \cdot \left(\frac{1}{(\text{income})^{\sigma.r}} \right) \right]}{1} = \frac{1}{\left[\frac{(\pi)^{\sigma.r}}{(i) + (m)} \right]}$$

In which the incentive and monitoring mechanism cause the equality of utility function among them.

$$U_{\text{shareholder}} \neq U_{\text{manager}}$$

Managerial monitoring and incentives are frequently used as a proxy for corporate governance mechanisms. Previous research has validated empirical data as well as theoretical foundations indicating the important role of corporate governance in driving innovation decisions, as discussed previously. The current study, on the other hand, contends that corporate governance and innovation are inextricably linked. The expression is extended in the following mathematical illustrations.

$$U_{\text{manager}} = \frac{(i) + (m)}{1} \cdot \frac{1}{(\text{income})^{\sigma.r}}$$

$$U_{\text{manager}} = \frac{(i) + (m)}{(\text{income})^{\sigma.r}}$$

$$U_{\text{manager}} \cdot [(\text{income})^{\sigma.r}] = (i) + (m)$$

We should carefully pay attention to the relation between high-risk projects ($\sigma.r$) and corporate governance mechanism ($i + m$) in those mathematical illustrations. If the value of a high-risk project ($\sigma.r$) changes, the value of corporate governance will change as well. To put it another way, if the value of corporate governance ($i + m$) changes, the value of a high-risk project ($\sigma.r$) will eventually shift as well. The mathematical proof underpins the logical reason of hypothesis development which proposes simultaneous relation between corporate governance and innovation. Moreover, the organizational structure has adjusted to the environmental technological changes. In addition, many previous scholars revealed that innovation in the public service has impacted the efficiency and effectiveness of institutional governance (Hartley, 2005; Papadopoulos & Warin, 2007). Accordingly, the present research formulates the following hypothesis.

H1: *GCG has a positive and significant relationship with corporate innovation.*

H2: *Corporate innovation has a positive and significant relationship with GCG.*

2.2. Financial Constraint

According to the concept of financial constraints, innovation is a process that necessitates a significant amount of finance (Savignac, 2008). To put it another way, this hypothesis contends that the availability of cash has been a significant factor in supporting successful corporate innovation. As a result, organizations with limited financial flow face difficulties in generating new ideas. Several previous research has shown that this theory has made a substantial contribution to the understanding of how an innovation process occurs (Fazzari & Petersen, 1993; Gorodnichenko & Schnitzer, 2013; Guariglia & Liu, 2014; Hall et al., 2016; Agénor & Canuto, 2017; García-Quevedo et al., 2018; Li & Lu, 2018; Lv et al., 2018). It is logically acceptable since firms with the availability and flexibility of capital flows have various options for research and development (R&D) policies to increase future corporate innovation. In relation to this issue, the availability of cash makes managers feel more at ease in making and accelerating their innovative initiatives.

The present research employs different proxies in measuring financial constraints. As depicted in the aforementioned discussion, some previous studies used the firm's cash flow to examine the variable of financial constraints. However, rather restricted to the firm's cash flow, corporate innovation is more likely depending on the firms' total assets (Pham et al., 2017; Raharja et al., 2017; Lei et al., 2018; Liu & Atuahene-Gima, 2018; Raharja & Mranani 2019). The reason for the statement is that creating a strategic innovation should be supported by infrastructure as the real assets of companies. Real assets further manifest the current readiness level of the firm to start the innovation decisions. The firms with less assets imply that all this time they experience any financial constraint on assets investment management. Therefore, the third hypothesis of this research is formulated as follows.

H3: *Firms' asset has a positive and significant relationship with the firm's innovation level.*

3. Research Methods

3.1. Research Approach

This study used a quantitative technique with secondary data to find the most liquid stock (LQ-45) on the Indonesian Stock Exchange (IDX) from 2000 to 2021.

The availability of financial statements from those firms, which, as widely believed, are rarely delisted from the market, was the primary rationale for choosing LQ-45 as a research sample.

3.2. Data and Variable

The present research made use of secondary data obtained from companies listed and categorized as the most liquid stock in the Indonesian Stock Exchange (IDX) from 2000 to 2021. In total, this research applied 1,910 observations to confirm the proposed hypothesis.

There are several steps in the process of hypothesis testing. To begin, this study used principal component analysis to evaluate the corporate governance assessment indicator (PCA). Its goal is to use linear combinations of variables to understand the structure of covariance. The factor analysis, which establishes the validity of corporate governance measuring scales, includes this analysis technique. It also minimizes the number of variables that are not mutually correlated, which improves covariance. It is a multivariate analysis that turns the original variables into a new variable that is mutually correlated.

Several indicators were introduced to measure corporate governance in principal component analysis such as the number of commissioners (TCOM), the number of independent commissioners (INDPCOM), the number of employee incentives (INCTV), institutional ownership (INSOWN), the number of female commissioners (FEMCOM), the type of the firm (SOE) and the total share owned by company managers (CEODUAL). The seven factors that were grouped to the corporate governance indicator variable are examined using principal component analysis. In other words, the PCA analysis is used to construct the corporate governance variable in this study (GOV). This study uses two-stage least square regression analysis (TSLS) to examine the relationship between the variables, as shown in Equations 1 and 2.

$$\text{INOV}_i = \sigma_1 + \beta_1 \cdot \text{CG}_i + \beta_2 \text{TA}_i + \beta_3 \text{SG} + \beta_4 \text{EG}_i + \beta_5 \text{FINLEV} + \beta_6 \text{DOL} + \varepsilon_i \quad (1)$$

$$\text{CG}_i = \sigma_1 + \beta_1 \cdot \text{INOV}_i + \beta_2 \text{TA}_i + \beta_3 \text{SG} + \beta_4 \text{EG}_i + \beta_5 \text{FINLEV} + \beta_6 \text{DOL} + \varepsilon_i \quad (2)$$

Equations 1 and 2 are simultaneous regression models (TSLS) that facilitate the simultaneous relationships between innovation and corporate governance. In that model, the variables of INOV, TA, and CG are endogenous, while GROWTH, FINLEV, and DOL are exogenous variables. Table 1 below explains the description of each variable in the model and how it is measured.

Table 1: Description of Variable

Variables	Description	Measurement
INOV	The level of innovation of the firm	The amount of R&D cost
CG	Corporate governance	Employing by PCA
TA	The total assets of the firm	The total assets of the firm
SG	The sales growth of the firm	The revenues at time t minus the revenues at time $t-1$ divided by the revenue of $t-1$
EG	The earnings growth of the firm	EBIT at year t minus EBIT year $t-1$ divided by EBIT at year $t-1$
FINLEV	The financial risk of the firm	Measured by Debt to Equity Ratio (Total Debt divided by Total Equity)
DOL	The operational risk of the firm	Measured by the degree of operating leverage
TCOM	Total commissioner of the firm	The number of board commissioner
INDPCOM	Total independent commissioner of the firm	The number of independent in the board of commissioner
INCTV	The employee incentive	The total incentive that shared with the employee
INSOWN	The institutional ownership	The number of stocks held by institutions
FEMCOM	The female commissioner	The number of female commissioners in the board of commissioner
CEODUAL	CEO Duality	The number of stocks owned by the employee
SOE	The type of the firm	If the firms is state-owned enterprises = 1; otherwise = 0

Table 2: The Result of Principal Component Analysis

Variables	Eigenvalue	Cum. Variance
TCOM	1.17	16.78%
INDPCOM	1.07	15.31%
INCTV	1.86	26.61%
INSOWN	0.87	12.48%
FEMCOM	1.00	13.43%
CEODUAL	0.76	10.97%
SOE	0.30	4.38%

4. Results

As the first phase of the data analysis procedure, the Principal Component Analysis (PCA) was tested to reduce the original variables of corporate governance. Table 2 below shows the test results.

As depicted in Table 2, there are four variables having eigenvalue values that were greater than or equal to 1 (≥ 1), i.e., a total number of commissioners (1.07), employee incentive (1.86), female commissioner (1.00), and a total number of independent commissioners (1.17). The cumulative percentage of these four variables in explaining the variances of corporate governance variables amounted to 72.13%. Thus, it could be concluded that those four

Table 3: The Research Result

	INOV (Model 1)	CG (Model 2)
CG	0.35 (4.38)***	
INOV		0.20 (4.38)***
TA	0.60 (15.1)***	0.15 (3.66)***
SG	0.03 (2.02)***	0.00 (0.59)
EG	-0.00 (-0.46)	-0.00 (-0.53)
FINLEV	0.00 (0.15)	-0.00 (-0.28)
DOL	0.00 (0.21)	-0.00 (-0.38)
Adjusted R-square	0.67	0.39
F-statistic	87.53***	28.76***

*** p -value < 0.05.

variables were valid as an indicator of corporate governance measurement scales. Whereas, the other three variables which had eigenvalue less than 1 (< 1) were deleted from the measurement of corporate governance construct. Furthermore, it was measured by re-averaging the values of them in each firm to further be used as a measurement proxy of the corporate governance variable and included in the regression analysis model.

Table 3 shows the results of the regression analysis with the two-stage least square method. Based on the results, all the proposed hypotheses were accepted. For instance, this

research proved that corporate governance has a positive significance. It is confirmed by the *t*-statistical value in model 1 ($4.38 > 1.96$). The association between corporate governance and business innovation has a parameter influence on corporate innovation coefficient of 0.35, with a significant threshold of 5%. It means that a one-point increase in corporate governance would result in a 0.35-point increase in business innovation. Furthermore, the second hypothesis, that business innovation has a favorable impact on corporate governance, was supported by this study. It is proven by the *t*-statistical value in model 2 ($4.38 > 1.96$). The parameter coefficient of the corporate innovation relationship in explaining corporate governance is 0.20 with a significant level of 5%. Therefore, based on the results of the two hypotheses, the argument of this study states that innovation and corporate governance have a significant simultaneous relationship. The level of corporate firms' innovation is not only affected by the corporate governance in the one-way direction. Furthermore, the result of data analysis also confirmed the third hypothesis. The total assets owned by the companies positively and significantly influenced their innovation. It is proved by the *t*-statistic level of 15.10 (>1.96) and the coefficient parameter of the regression analysis in model 1. As discussed earlier, the company's total asset is a proxy for measuring company wealth to facilitate the test of financing constraint theory.

Table 3 shows the robustness of the two-step least squares regression model, in addition to the results of hypothesis testing. Based on the findings, We can conclude that Models 1 and 2 are robust, as evidenced by their *F*-statistic and Adjusted *R*-square values. Model 1 has an *F*-statistic of 87.53 (<0.05), while model 2 has an *F*-statistic of 28.76 (<0.05). Furthermore, the adjusted *R*-square values of the two models are 67% for model 1 and 39% for model 2.

5. Conclusion

The present research sheds some light on the evidence of a simultaneous relationship between corporate innovation and corporate governance. Furthermore, this study proposes a novel corporate governance measurement method that differs from past studies. Instead of separately incorporating many variables into the model, this study used a single construct to assess corporate governance. As a result, a two-stage linear regression model and principal component analysis are used in this study to meet the research aims. A relationship between corporate governance and corporate innovation is postulated in the first hypothesis, while a relationship between innovation and corporate governance is proposed in the second. Both hypotheses support the central claim of this study, which is that corporate governance and innovation have a simultaneous effect. As a result, the third hypothesis supports the financing limitations theory by elucidating corporate innovation.

The findings of this study provide a plethora of empirical and practical evidence. This study, for example, established the validity of widely used corporate governance indicators. The validity of seven corporate governance indicators, including the number of commissioners (TCOM), the number of independent commissioners (INDPCOM), the number of employee incentives (INCTV), institutional ownership (INSOWN), the number of female commissioners (FEMCOM), the type of firm (SOE), and the total share owned by company managers, was confirmed using principal component analysis (CEODUAL). As a result, principal component analysis is used in this study to minimize the variable with the lowest cumulative variance (eigenvalue < 1).

As a result, this study completely validates four original variables as a measure of corporate governance. Employee incentives (INCTV), the total number of commissioners (TCOM), number of independent commissioners (INDPCOM), and female commissioners (FEMCOM) on the board of commissioners. It empirically proves that four accepted variables, which make up the corporate governance construct, are valid measures. Furthermore, this finding serves as a starting point for creating a GCG index. That is, the corporate governance index can be determined by the four variables.

Furthermore, this research has practical implications. Employee incentives, for example, are an important variable in measuring corporate governance, as evidenced by the biggest cumulative variance in principal component analysis. As a result of this research, firms should pay close attention to the amount of incentive given to their employees (agents) to increase their corporate value.

Table 3 shows that all of the proposed hypotheses have been accepted. This indicates that this study demonstrates the coexistence of corporate governance and innovation. Theoretically, it also supports previous studies of the principal-agent framework theory in terms of assessing corporate innovation activities, and it introduces a new concept in terms of the simultaneous interaction between corporate governance and corporate innovation. Indeed, it is fascinating from the standpoint of practical issues, as the study provides empirical evidence of the critical role corporate governance plays in the creation of an innovative company.

Furthermore, the concurrent relationship between corporate governance and innovation reveals another crucial fact: innovation will ultimately have an impact on corporate governance. So, these two factors must be controlled continuously to realize the sustainability of the company in the future. The findings of this study further corroborate the hypothesis of financing constraints in explaining business innovation activities. This concept argues that organizations require appropriate capital resources to improve their innovation activities. In other words, these results have implications for the crucial role of total assets as a supporting infrastructure for the creation of innovation activities.

The current research recommends that the variable of corporate governance be examined in future studies. Future research must consider other variables in addition to the variables used in this study to construct the corporate governance variable. Simultaneous associations should not be limited to the two variables that are the subject of this examination in this study. Other factors, on the other hand, must be tested for reciprocity relationships because there is ample room for more in-depth investigation both theoretically and practically.

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