# LEVERS OF CONTROL, MANAGEMENT INNOVATION AND ORGANIZATIONAL PERFORMANCE IN HEAVY EQUIPMENT AND TRUCK COMPANIES IN NORTH KALIMANTAN

*Rita Chandra[1], Tubagus Ismail[2],Hana Norhamida[3]*

[13]Universitas Terbuka Tarakan, [2]Universitas Sultan Ageng Tirtayasa

rita.chandra@yahoo.com[1], ismailtb@yahoo.com[2],  hana@ecampus.ut.ac.id[3]

## Article Info

## Abstract

*This study aims to evaluate the crucial role of management control systems on organizational performance, by adopting the levers of control framework developed by Simons (1994). The sample in this study consisted of employees who held supervisory positions in heavy equipment and truck companies operating in the North Kalimantan region. The sampling technique used the purposive sampling method by distributing questionnaires to related companies, and succeeded in obtaining 57 respondents. Hypothesis testing was conducted using the PLS-SEM approach. The results of the analysis showed that enabling control has a direct effect on organizational performance, while constraining control has an indirect impact. In addition, management innovation has been shown to have a direct effect on organizational performance, and is a mediator in the relationship between constraining control and organizational performance.*

## INTRODUCTION

Amid the still unstable global economic conditions, the ILMATE sector (metal, machinery, transportation equipment, and electronics industry) actually recorded positive performance, with growth reaching 10.7 percent in 2023, surpassing the national economic growth rate (Data from the Ministry of Industry, 2024). The strong performance of the machinery industry was driven by the increase in heavy equipment production. The ILMATE sector is considered to have made an important contribution to the development of the manufacturing industry and the Indonesian national economy as a whole.

As more and more business players enter the heavy equipment market, heavy equipment companies that have long been operating in Indonesia are trying to maintain their competitiveness by prioritizing service quality and customer satisfaction. To achieve

this goal, these companies strive to become trusted partners by ensuring the availability of heavy equipment, spare parts, and after-sales services according to customer needs. One strategy used to attract and retain customers is to build a network of branches in various cities in Indonesia. In order for these branches to run optimally, the company needs to control all operational processes and activities in each branch. In addition, it is important for management to ensure that operational decisions, both those taken at the branch and at the head office, are in line with the company's goals and strategies. Therefore, a management control system (MSS) is very crucial to ensure that the company's activities are in line with the strategic direction that has been set.

Meanwhile, Baird et al. (2019) found that constraining control had no significant effect on performance. On the other hand, Gomez-Conde et al. (2019) found that diagnostic control systems as a form of constraining control had a negative impact on organizational performance. However, different findings were revealed by Hernando et al. (2024), who stated that diagnostic control systems actually had a positive effect on performance. Because the results of previous studies have not been consistent, this study aims to more specifically test the direct effects of constraint systems and diagnostic control systems on organizational performance.

Baird et al. (2019) also stated that management innovation is part of the control process that can mediate the relationship between control constraints and organizational performance through the use of management accounting practices (PAM). The role of management in control includes the responsibility to direct employee behavior to align with organizational goals. Speklé et al. (2017) emphasize the importance of understanding the relationship between control and creativity.

Several studies in economics, management, and accounting have been conducted to explore and develop PAM (Hariadi et al., 2020). With the advancement of technology, organizations can now shift from traditional accounting tools to more sophisticated management accounting solutions (Pramono et al., 2023). PAM is a rapidly growing form of management innovation that contributes to strategic decision making.

In the last decade, many studies have focused on the implementation and adoption of PAM and its impact on performance measurement. Several studies concluded that PAM has a positive effect on organizational performance (Adelana, 2024; Zakaria, 2021; Adu-Gyamfi et al., 2020; Betinah et al., 2018; Sayyad, 2017; Omogbiya et al., 2016; Nor et al., 2016; Al-Qahtani et al., 2015; Saaydah et al., 2014). This study also examines the role of PAM in mediating the relationship between control constraints and organizational performance. Unlike Baird et al.'s (2019) study which looked at control constraints in general, this study examines in more depth two of its specific components: the constraint system and the diagnostic control system.

The respondents in this study were supervisory level employees from heavy equipment and truck companies operating in North Kalimantan. Based on BPS data in 2022, the economic structure in North Kalimantan is dominated by the mining sector, making it a prospective area for the expansion of heavy equipment and truck company branches. This study examines the relationship between the LOC framework, management innovation, and organizational performance in these companies in North

Kalimantan. It is hoped that the results of this study can contribute to the literature on LOC-based SPM and management innovation, as well as provide empirical evidence regarding the relationship between LOC, PAM, and organizational performance.

## RESEARCH METHODS

Hypothesis testing in this study was conducted using the Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis technique with the help of SmartPLS 4 software. This model uses Levers of Control (LOC) which includes enabling control, constraint systems, and diagnostic control systems as independent variables (exogenous), and management innovation and organizational performance as dependent variables (endogenous). The PLS-SEM method was chosen because it is able to estimate complex models with many constructs and indicators without requiring the data to follow a certain distribution. In addition, this software is user-friendly and relatively easy to operate, even by researchers with limited technical backgrounds (Hair et al., 2019). Another advantage, PLS-SEM is also suitable for small sample sizes in models with many constructs and items (Fornell & Bookstein, 1982; Willaby et al., 2015; Hair et al., 2017c).

The initial step in implementing PLS-SEM is to evaluate the outer model or reflective measurement model. Referring to Hair et al. (2019), this evaluation includes several criteria, namely outer loading value ≥ 0.60 (Chin, 1998), composite reliability ≥ 0.70, Cronbach's Alpha ≥ 0.70, and average variance extracted (AVE) ≥ 0.50. In addition, discriminant validity is also tested through the HTMT (Heterotrait Monotrait Ratio) ratio which must be <0.90, the Fornell and Lacker tests, and cross-loading analysis.

After the measurement model is declared valid, the next stage is to evaluate the inner model or structural model, to assess the relationship between variables in hypothesis testing. This evaluation is carried out through three stages: multicollinearity testing using inner VIF, hypothesis testing using bootstrapping techniques, and effect size assessment with F-square (Yamin, 2021).

The final stage is to measure the overall suitability of the model. In this case, the two main indicators used to assess the suitability of the model are the R-Square value and the Goodness of Fit Index (GoF) (Yamin, 2021).
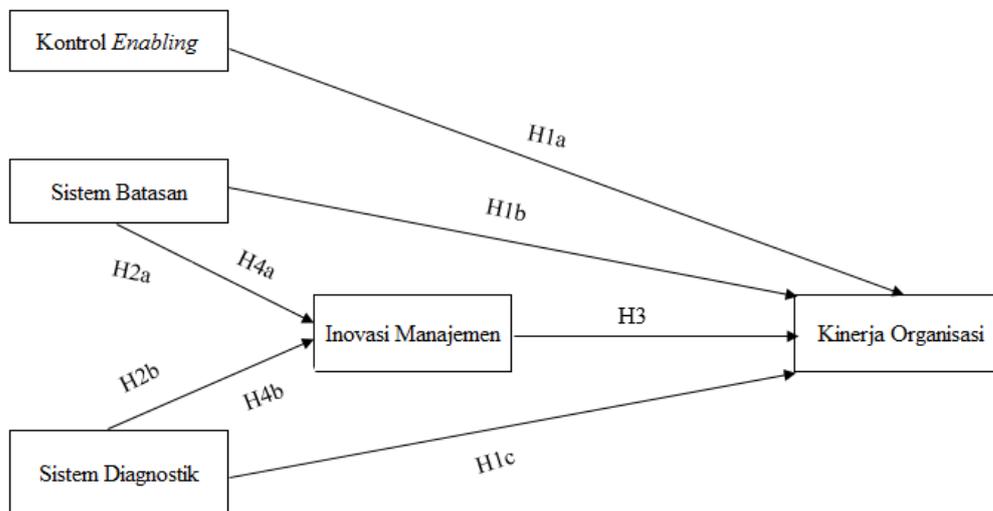
Figure 1. Outer Model Diagram

## RESULTS AND DISCUSSION

### A. Results of Construct Validity and Reliability Testing

Referring to the procedure in PLS-SEM analysis, variables such as enabling control, constraint system, diagnostic control system, management innovation, and organizational performance are analyzed reflectively using SmartPLS 4 software. The initial step taken is to evaluate the reflective measurement model with the following criteria: outer loading of at least 0.60 (Chin, 1998), composite reliability of at least 0.70, Cronbach's Alpha of at least 0.70, and average variance extracted (AVE) of at least 0.50. After that, discriminant validity is tested through the Heterotrait Monotrait Ratio (HTMT) indicator which must be below 0.90, as well as through the Fornell and Lacker criterion approach and cross loading analysis. Based on the results of the initial estimation of the measurement model through outer loading, all indicators are declared to meet the validity criteria.

Based on the results of the composite reliability and average variance extracted (AVE) tables in table 1, all variables, namely enabling control, boundary system, diagnostic control system, management innovation, and organizational performance meet the validity criteria with composite reliability values ≥ 0.70, Cronbach's Alpha ≥ 0.70, and AVE ≥ 0.50. Therefore, all variables are declared valid.

Table 1. Composite Reliability and Average Variance Extracted Table

|  | Cronbach's alpha | *Composite reliability*(rho_a) | *Composite reliability*(rho_c) | Average variance extracted (AVE) |
|---|---|---|---|---|
| *ENABLING* | 0.952 | 0.954 | 0.959 | 0.701 |
| LIMITATION | 0.899 | 0.905 | 0.930 | 0.768 |

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|---|---|---|---|---|
| DIAGNOSTIC | 0.904 | 0.910 | 0.933 | 0.777 |
| INNOVATION | 0.921 | 0.928 | 0.935 | 0.616 |
| PERFORMANCE | 0.886 | 0.890 | 0.922 | 0.749 |

The next step is to test the discriminant validity, which includes testing the Heterotrait Monotrait Ratio (HTMT) value which must be below 0.90, as well as the Fornell and Lacker criteria and cross-loading analysis. Discriminant validity is a method to ensure that each variable in the model is indeed theoretically different and also proven to be empirically different (Hair et al., 2021). Hair et al. (2019) recommends using HTMT because it is considered more sensitive and accurate in identifying discriminant validity, with a recommended threshold of less than 0.90.

Table 2. HTML table

| VARIABLES | *HTML* |
|---|---|
| DIAGNOSTICS <-> LIMITATIONS | 0.631 |
| *ENABLING*<-> LIMITATIONS | 0.753 |
| *ENABLING*<-> DIAGNOSTICS | 0.904 |
| INNOVATION <-> LIMITATIONS | 0.606 |
| INNOVATION <-> DIAGNOSTICS | 0.833 |
| INNOVATION <-> ENABLING | 0.790 |
| PERFORMANCE <-> LIMITATIONS | 0.654 |
| PERFORMANCE <-> DIAGNOSTICS | 0.682 |
| PERFORMANCE <-> ENABLING | 0.809 |
| PERFORMANCE <-> INNOVATION | 0.782 |

Referring to the table presented, it is known that the enabling control variable shows a multicollinear correlation with the diagnostic control system variable, indicated by the HTMT value of 0.904 which exceeds the maximum limit of 0.90. A high level of multicollinearity can cause the parameter estimation results to be inaccurate and less efficient, such as increasing standard error values, widening confidence intervals on path coefficients, and less valid hypothesis testing results (Yamin, 2021). To overcome the problem of HTMT being too high, Hair et al. (2017) in Yamin's (2021) quote suggested one solution, namely by removing constructs that have a very high correlation with other constructs.

Table 3. Construct Correlation Table

|  | ENABL1 | ENABL2 | ENABL3 | ENABL4 | ENABL5 | ENABL6 | ENABL7 | ENABL8 | ENABL9 | ENABL10 |
|---|---|---|---|---|---|---|---|---|---|---|
| **DIAG1** | 0.640 | 0.512 | 0.594 | 0.651 | 0.803 | 0.754 | 0.686 | 0.740 | 0.787 | 0.722 |
| **DIAG2** | 0.410 | 0.385 | 0.478 | 0.549 | 0.686 | 0.613 | 0.549 | 0.419 | 0.622 | 0.722 |
| **DIAG3** | 0.594 | 0.643 | 0.510 | 0.500 | 0.739 | 0.556 | 0.690 | 0.609 | 0.610 | 0.756 |
| **DIAG4** | 0.590 | 0.554 | 0.423 | 0.411 | 0.796 | 0.633 | 0.659 | 0.707 | 0.672 | 0.768 |

Referring to the correlation table between constructs, ENABL5 and ENABL10 show quite high correlations with variables DIAG1, DIAG2, DIAG3, and DIAG4. Therefore, both constructs will be removed from the PLS-SEM analysis, and the estimation process for all variable constructs will be repeated from the beginning.

Table 4. Outer Loading, Composite Reliability and Average Variance Extracted (Reestimation) Table

| No. | Variables | Name | Indicator | Outer Loading | Cronbach's alpha | Composite reliability (rho_a) | AVE |
|---|---|---|---|---|---|---|---|
| 1 | ENABLING CONTROL | ENABL1 | Your company's mission statement communicates the company's core values. | 0.835 | 0.939 | 0.941 | 0.703 |
| 2 | | ENABL2 | Top management communicates the company's core values to employees. | 0.812 | | | |
| 3 | | ENABL3 | Employees are aware of the company's core values. | 0.823 | | | |
| 4 | | ENABL4 | The company's mission statement serves as an inspiration to employees. | 0.888 | | | |
| 5 | | ENABL6 | The performance measurement system is used routinely during the implementation of face-to-face meeting schedules between operational managers and top-level managers. | 0.799 | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 6 | | ENABL7 | Performance measurement systems are often used as a means to develop ongoing action plans. | 0.827 | | | |
| 7 | | ENABL8 | The performance measurement system produces important information so that it becomes an agenda in discussions between operational managers and top level managers. | 0.848 | | | |
| 8 | | ENABL9 | Performance management systems are used by operational managers and top level managers to discuss changes occurring within business units. | 0.87 | | | |
| 9 | | LIMIT1 | The Company Code of Conduct provides employees with information about what actions are prohibited. | 0.895 | | | |
| 10 | LIMIT SYSTEM | LIMITS2 | Your company informs employees about the risks they need to avoid. | 0.85 | 0.899 | 0.905 | 0.768 |
| 11 | | LIMIT3 | The Company's Code of Conduct explains appropriate employee behavior. | 0.91 | | | |
| 12 | | LIMIT4 | Employees in your company are aware of the company's code of ethics. | 0.849 | | | |
| 13 | DIAGNOSTIC SYSTEM | DIAG1 | Control systems are implemented to check progress towards company targets and monitor the results. | 0.906 | 0.904 | 0.91 | 0.777 |
| 14 | | DIAG2 | Control systems are implemented to review performance. | 0.843 | | | |

| No | | | | | | | |
|---|---|---|---|---|---|---|---|
| 15 | | DIAG3 | The control system is carried out to plan how the company's operations are carried out in accordance with the strategic plan. | 0.868 | | | |
| 16 | | DIAG4 | Control systems are implemented to identify significant results that do not meet expectations and to take appropriate further action. | 0.908 | | | |
| 17 | | INV1 | Does your company implement benchmarking performance comparison? | 0.69 | | | |
| 18 | | INV2 | Does your company implement activity-based management? | 0.757 | | | |
| 19 | | INV3 | Does your company implement activity-based costing? | 0.683 | | | |
| 20 | | INV4 | Does your company implement a balanced scorecard? | 0.819 | | | |
| 21 | MANAGEMENT INNOVATION | INV5 | Does your company implement quality costing? | 0.882 | 0.921 | 0.928 | 0.616 |
| 22 | | INV6 | Does your company implement value chain analysis? | 0.881 | | | |
| 23 | | INV7 | Does your company implement a total quality management system? | 0.843 | | | |
| 24 | | INV8 | Does your company implement key performance indicators (KPIs)? | 0.695 | | | |
| 25 | | INV9 | Does your company implement strategic cost management? | 0.78 | | | |
| 26 | ORGANIZATIONAL PERFORMANC | KIN1 | Does the company achieve customer satisfaction targets? | 0.862 | 0.886 | 0.89 | 0.749 |

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| 27 | E KIN2 | Can your company achieve the quantity targets of goods and services desired by customers? | 0.903 | | | |
|----|------|------|-------|--|--|--|
| 28 | KIN3 | Can your company achieve the quality targets for goods and services desired by customers? | 0.926 | | | |
| 29 | KIN4 | Can your company meet the deadlines that customers want? | 0.761 | | | |

The enabling control variable is measured using eight indicators that have been proven valid, with outer loading values ranging from 0.799 to 0.888. This shows that all indicators have a strong relationship in explaining the enabling control construct. The composite reliability value of 0.941 and Cronbach's Alpha of 0.939, both exceed the minimum limit of 0.70 indicating a high level of reliability. Meanwhile, convergent validity is also met with an AVE value of 0.703 which exceeds the threshold of 0.50. Of all the indicators, ENABL4 (LF = 0.888) which describes the company's mission as a source of inspiration for employees, and ENABL9 (LF = 0.870) which states that the performance management system is utilized by operational managers and upper management to evaluate changes in business units, are the most dominant indicators.

The boundary system variable is measured through four valid indicators, with outer loadings ranging from 0.849 to 0.910. The composite reliability value of 0.905 and Cronbach's Alpha of 0.899 indicate very good internal consistency, and the AVE value of 0.768 strengthens the evidence of convergent validity. Among these indicators, BATAS3 (LF=0.910)—which emphasizes that the company's code of ethics explains expected employee behavior—and BATAS1 (LF=0.895)—which conveys prohibitions on certain behaviors to employees—are the most representative indicators.

The diagnostic control system variable consists of four valid indicators, with outer loading values between 0.843 and 0.908. The composite reliability value of 0.910 and Cronbach's Alpha of 0.904 indicate very high reliability, and the AVE of 0.777 confirms convergent validity. DIAG4 (LF=0.908)—which indicates that the control system is used to identify and respond to discrepancies in results—and DIAG1 (LF=0.906)—which reflects monitoring progress toward company goals—are the indicators that most strongly reflect this construct.

The management innovation variable is assessed through nine valid indicators with outer loading values between 0.690 and 0.882. The evaluation results show good reliability with a composite reliability of 0.928, Cronbach's Alpha of 0.921, and an AVE value of 0.616. Among these indicators, INV5 (LF=0.882) on the implementation of quality costing and INV6 (LF=0.881) on the use of value chain analysis are the two most prominent indicators.

Organizational performance variables are measured using four indicators that have outer loadings between 0.761 and 0.926. The composite reliability value of 0.890, Cronbach's Alpha of 0.886, and AVE of 0.749 indicate that this variable has an adequate

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level of reliability and convergent validity. The PERFORMANCE3 indicator (LF=0.926) which shows the achievement of product and service quality received by customers, and PERFORMANCE2 (LF=0.903) regarding the achievement of service and product quantity, are the most dominant in measuring organizational performance.

The next stage in the evaluation process is testing discriminant validity, which is carried out using three approaches: (1) the HTMT (Heterotrait Monotrait) ratio with a threshold value of <0.90, (2) the Fornell and Lacker test, which requires the square root of the AVE to be greater than the correlation between variables, and (3) cross loading analysis to ensure that each indicator loads its own construct higher than other constructs.

Table 5
HTML Table

|  | Heterotrait-monotrait ratio (HTMT) |
|---|---|
| DIAGNOSTICS <-> LIMITATIONS | 0.631 |
| *ENABLING*<-> LIMITATIONS | 0.773 |
| *ENABLING*<-> DIAGNOSTICS | 0.861 |
| INNOVATION <-> LIMITATIONS | 0.606 |
| INNOVATION <-> DIAGNOSTICS | 0.833 |
| INNOVATION <-> ENABLING | 0.764 |
| PERFORMANCE <-> LIMITATIONS | 0.654 |
| PERFORMANCE <-> DIAGNOSTICS | 0.682 |
| PERFORMANCE <-> ENABLING | 0.824 |
| PERFORMANCE <-> INNOVATION | 0.782 |

The results of the HTMT test show that all pairs of variables have values below the threshold of 0.90, which indicates that discriminant validity has been met. Thus, no multicollinearity was found among the variable constructs in the model

Table 6. Fornell and Larcker table

|  | LIMITATION | DIAGNOSTIC | *ENABLING* | INNOVATION | PERFORMANCE |
|---|---|---|---|---|---|
| LIMITATION | 0.876 |  |  |  |  |
| DIAGNOSTIC | 0.575 | 0.882 |  |  |  |
| *ENABLING* | 0.717 | 0.795 | 0.838 |  |  |
| INNOVATION | 0.567 | 0.773 | 0.731 | 0.785 |  |
| PERFORMANCE | 0.587 | 0.616 | 0.756 | 0.723 | 0.865 |

The diagonal values are the roots of AVE and the other values are the correlations.

According to the Fornell and Larcker (1982) criteria, discriminant validity can be said to be fulfilled if the square root of the AVE value of a variable is greater than the correlation of the variable to other variables. In this study, the boundary system variable has an AVE root value of 0.876, which is higher than its correlation with the diagnostic control system variable (0.575), enabling control (0.717), management innovation (0.567), and organizational performance (0.587). This shows that the discriminant validity of the boundary system variable has been fulfilled.

For the diagnostic control system variable, the AVE root value of 0.882 is also greater than its correlation with enabling control (0.795), management innovation (0.773), and organizational performance (0.616), so that its discriminant validity is also fulfilled.

Furthermore, the enabling control variable has an AVE root value of 0.838 which is higher than its correlation with management innovation (0.731) and organizational performance (0.756), indicating that the discriminant validity for this variable has also been achieved.

Likewise, the management innovation variable has an AVE root of 0.785 which exceeds its correlation with the performance variable (0.723), so its discriminant validity is declared fulfilled.

Finally, the organizational performance variable shows the AVE root of 0.865 which is higher than its correlation with enabling control (0.756), constraint system (0.587), diagnostic control system (0.616), and management innovation (0.723). This also shows that the discriminant validity for the organizational performance variable has been met.

The following is a design of the outer model compiled using SmartPLS 4. The diagram shows the relationship between the enabling control variables, the constraint system, and the diagnostic control system with the management innovation and organizational performance variables.
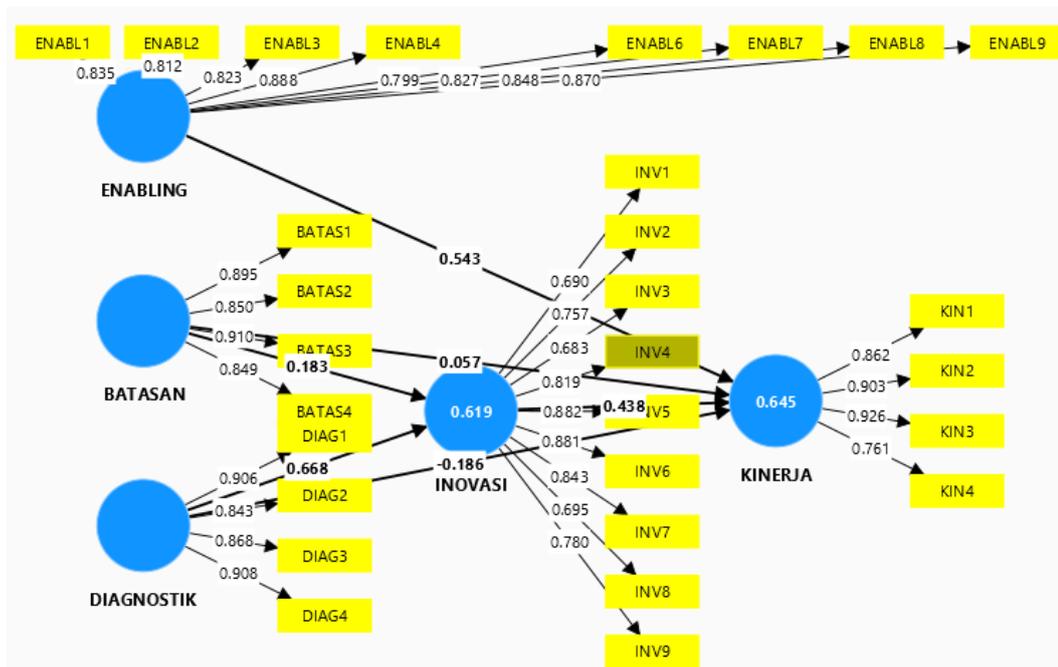
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Figure 2 Outer Model Diagram

## B. Structural Model Evaluation

Evaluation of the structural model is related to testing the hypothesis regarding the relationship between variables in the study. This evaluation process is carried out through three main stages, namely: multicollinearity testing using inner VIF, hypothesis testing using the bootstrapping method, and effect size testing using the F-square value (Yamin, 2021).

The first stage begins with an examination of whether there are symptoms of multicollinearity in the model. This test aims to detect whether there is a high correlation between independent variables in the regression (Ghozali, 2016). High multicollinearity can cause the regression model to fail to accurately explain the relationship between the independent and dependent variables (Supriyadi et al., 2017). The presence of multicollinearity can also increase the variance of the estimated parameters, thereby reducing the level of accuracy of the estimate (Sukmono, 2014).

To detect multicollinearity between variables in the structural model, the Inner VIF (Variance Inflated Factor) test is used. An Inner VIF value below 5 indicates that there is no multicollinearity between variables in the model (Hair et al., 2019).

Table 7. Multicollinearity Test Table

|  | *VIF* |
|---|---|
| LIMITATIONS -> INNOVATION | 1,495 |
| LIMITATIONS -> PERFORMANCE | 2,079 |
| DIAGNOSTICS -> INNOVATION | 1,495 |
| DIAGNOSTICS -> PERFORMANCE | 3.458 |
| *ENABLING*-> PERFORMANCE | 3.922 |
| INNOVATION -> PERFORMANCE | 2,758 |

Based on the results in the VIF table, all values are below 5, which indicates no symptoms of multicollinearity between variables. This finding confirms that the parameter estimates in the PLS-SEM model are robust or unbiased.

The second stage in evaluating the structural model is testing the hypothesis between variables, which is done by analyzing the t-statistic or p-value. If the t-statistic value exceeds 1.96 (t-table value) or the p-value is below 0.05, then it can be concluded that there is a significant influence between the variables in the model.

## Table 8. Hypothesis Test Table

| No | Hypothesis | Original sample (O) | Sample mean (M) | Standard deviation (STDEV) | T statistics (|O/STDEV|) | P values |
|---|---|---|---|---|---|---|
| H1A | *ENABLING*-> PERFORMANCE | 0.543 | 0.573 | 0.216 | 2,515 | 0.012 |
| H1B | LIMITATIONS -> PERFORMANCE | 0.057 | 0.038 | 0.165 | 0.343 | 0.732 |
| H1C | DIAGNOSTICS -> PERFORMANCE | -0.186 | -0.203 | 0.198 | 0.939 | 0.348 |
| H2A | LIMITATIONS -> INNOVATION | 0.183 | 0.180 | 0.158 | 1.157 | 0.248 |
| H2B | DIAGNOSTICS -> INNOVATION | 0.668 | 0.682 | 0.131 | 5.111 | 0.000 |
| H3 | INNOVATION -> PERFORMANCE | 0.438 | 0.444 | 0.179 | 2,442 | 0.015 |
| H4A | LIMITATIONS -> INNOVATION -> PERFORMANCE | 0.080 | 0.079 | 0.079 | 1,008 | 0.314 |
| H4B | DIAGNOSTICS -> INNOVATION -> PERFORMANCE | 0.292 | 0.305 | 0.147 | 1,993 | 0.046 |

Based on the results of the path coefficient table, the following findings were obtained:

1. Control *enable* has a positive and significant effect on organizational performance, with a coefficient value of 0.543. The t-statistic value is 2.515 (greater than 1.96) and the p-value is 0.012 (less than 0.05), so the H1a hypothesis is accepted.

2. The boundary system does not have a significant effect on organizational performance, with a coefficient value of 0.057, *t-statistic* 0.343 (< 1.96), and p-value 0.732 (less than 0.05), then hypothesis H1b is rejected.

3. The diagnostic control system has a negative and insignificant influence on organizational performance, with a coefficient of -0.186, *t-statistic* 0.939, and p-value 0.348. Therefore, hypothesis H1c is rejected.

4. The influence of the limitation system on management innovation of 0.183 is stated to be insignificant, with *t-statistic* 1.157 and p-value 0.248. Therefore, hypothesis H2a is rejected.

5. The diagnostic control system has a significant influence on management innovation, with a coefficient of 0.668. *t-statistic* 5.111 (> 1.96), and p-value 0.000 (< 0.05). Therefore, hypothesis H2b is accepted.

6. Management innovation has also been proven to have a significant influence on organizational performance, with a coefficient value of 0.438. *t-statistic* 2.442, and p-value 0.015. Therefore, hypothesis H3 is accepted.

7. The mediating effect of management innovation between the boundary system and organizational performance is not significant (coefficient 0.080, *t-statistic* 1.008, and p-value 0.314), so that hypothesis H4a is rejected.

8. Meanwhile, management innovation is proven to significantly mediate the relationship between diagnostic control systems and organizational performance, with a coefficient value of 0.292.    *t-statistic*1.993,   and  p-value  0.046.  Therefore, hypothesis H4b is accepted. Since the direct effect of diagnostic control system on organizational performance is not significant (H1c is rejected), then this form of mediation is full mediation.

Next, the following shows the inner model design built using SmartPLS 4. The diagram visualizes the relationship between variables, namely enabling control, constraint system, and diagnostic control system on management innovation and organizational performance through hypothesis testing.
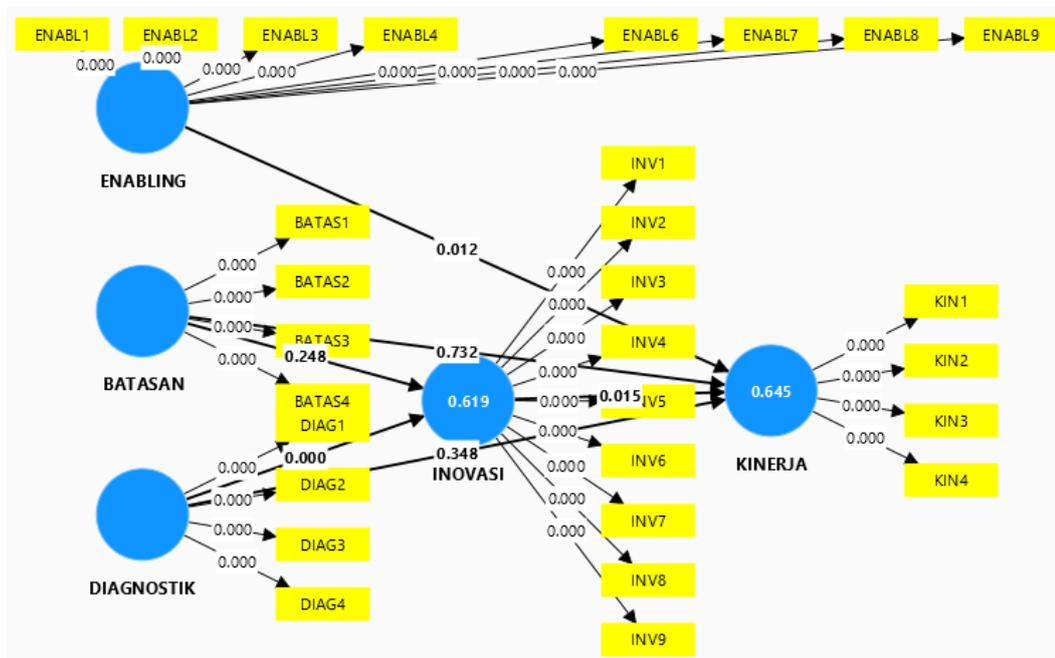


Figure 3 Inner Model Diagram

The third step in evaluating the structural model is to examine the F-Square value, which is used to assess the magnitude of the influence between variables in the structural model. Referring to Yamin (2021), the interpretation of the F-Square value is divided into three categories: 0.02 indicates a weak influence, 0.15 indicates a moderate influence, and 0.35 indicates a strong influence.

Table 9. F-Square Table

|  | F-SQUARE |
|---|---|
| *ENABLING*-> PERFORMANCE | 0.212 |
| LIMITATIONS -> PERFORMANCE | 0.004 |
| DIAGNOSTICS -> PERFORMANCE | 0.028 |
| LIMITATIONS -> INNOVATION | 0.059 |

| | |
|---|---|
| DIAGNOSTICS -> INNOVATION | 0.783 |
| INNOVATION -> PERFORMANCE | 0.196 |

Based on the results of the hypothesis test that has been carried out, the following conclusions were obtained:

1. Control *enable*provides a moderate category influence on organizational performance, indicated by the F-Square effect size value of 0.212.
2. The boundary system has a very weak influence on organizational performance, with an F-Square value of 0.004.
3. The diagnostic control system has a low influence on organizational performance, with an F-Square value of 0.028.
4. The influence of the boundary system on management innovation is also relatively low, with an F-Square of 0.059.
5. The diagnostic control system has a strong influence on management innovation, as indicated by the high F-Square value, namely 0.783.
6. Management innovation has a moderate influence on organizational performance, with an F-Square value of 0.196.

### C.  Evaluation of Goodness of Fit and Suitability of Model

SEM-PLS analysis is a variance-based approach used to test and develop theoretical models, with a primary focus on predictive ability. Therefore, there are several indicators used to assess the feasibility of the proposed model, namely the R-Square value and the Goodness of Fit Index (GoF Index).

The R-Square statistical measure is used to show how much endogenous variables can be explained by exogenous variables or other endogenous variables in a model. Based on Chin's (1998) criteria, the R-Square value can be interpreted qualitatively as follows: 0.19 reflects a low influence, 0.33 indicates a moderate influence, and 0.66 indicates a high influence.

Table 10. R-Square Table

| | *R-square* | *R-square adjusted* |
|---|---|---|
| INNOVATION | 0.619 | 0.605 |
| PERFORMANCE | 0.645 | 0.618 |

From the results of data analysis, it is known that the enabling control variables, the constraint system, and the diagnostic control system together are able to explain the variation in organizational performance by 0.645 or 64.5%. This value is included in the category of moderate influence approaching high. Meanwhile, the combined influence of the three variables on management innovation reaches 0.619 or 61.9%, which is also included in the category of moderate influence approaching high.

Meanwhile, the Goodness of Fit (GoF) Index is used as a measure of overall evaluation of the model, including assessments of the measurement model and structural model. This value can only be calculated for models with reflective

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indicators and is obtained through the square root of the geometric product of the average communality value and the average R-Square value (Yamin, 2021).

According to Wetzels et al. (2009) in Yamin (2021), the interpretation of GoF values is as follows: 0.10 is categorized as low GoF, 0.25 as medium GoF, and 0.36 as high GoF.

Table 11. GoF Index Table

| Average Communality | Average R-square | GoF Index |
|---|---|---|
| 0.701 | 0.632 | 0.666 |

The calculation results show that the Goodness of Fit (GoF) value is 0.666, which is included in the high category. This indicates that the model used has a good level of fit, where the empirical data obtained is able to explain the measurement model and structural model as a whole with strong quality.

**DISCUSSION**

1. The Influence of LOC on Organizational Performance

In a study conducted by Baird et al. (2019), it was found that enabling control has a direct impact on organizational performance, while constraining control only has an indirect effect. In this study, researchers directly tested the effect of enabling control and two types of constraining control, namely the boundary system and the diagnostic control system, on organizational performance.

The results of this study indicate that enabling control does have a direct influence on organizational performance, while constraining control, both the boundary system and the diagnostic control system, does not show a direct influence. Enabling control functions to build the company's core values that provide inspiration, encourage exploration of new ideas, and facilitate organizational learning in formulating strategies. This positive encouragement helps members of the organization take action and make strategic decisions, which ultimately have a direct impact on improving organizational performance. The stronger the implementation of enabling control, the greater its contribution to performance.

In contrast, the constraint system that emphasizes ethics and risk areas to be avoided, as well as the diagnostic control system that functions to monitor and assess performance, did not have a direct influence on the achievement of organizational performance. This finding is in line with Baird et al. (2019) who also showed that constraining control does not directly affect organizational performance. For further research development, additional variables can be considered that might strengthen the direct influence of these two systems on organizational performance.

This study also provides an indication that LOC control should not be carried out separately. Consistent with Simons' (2000) view, all elements in the control system must be integrated simultaneously in order to optimally support the achievement of organizational goals.

2. The Influence of LOC on Management Innovation

Baird et al. (2019) stated that constraining control can have an impact on management innovation, especially through the implementation of management accounting practices. In this study, researchers evaluated two components of constraining control—the constraint system and the diagnostic control system—to determine their effects on managerial innovation.

The results of the study revealed that the constraint system has no direct influence on innovation, while the diagnostic control system has a significant influence. This indicates that among the constraining controls, the diagnostic control system plays a greater role in encouraging the creation of management innovation.

Diagnostic control systems are formal information systems used by management to monitor results and compare them to established standards (Simons, 1994). This process often requires support from management accounting practices (PAM) that can provide accurate and relevant data for strategic decision making. In addition to supporting managerial information, PAM also plays a role in motivating and directing the behavior of organizational members (Pires et al., 2023). Thus, the intensive use of diagnostic control systems encourages the adoption of innovative management techniques, especially in the form of PAM.

This finding is in line with Cools et al. (2017) and Müller-Stewens et al. (2020), which showed that the use of diagnostic control systems is positively correlated with the emergence of innovative ideas and new product innovation. The higher the level of use of these systems, the greater the application of innovation in management practices.

In contrast, boundary systems, which serve to limit undesirable behavior, have not been shown to have a direct effect on innovation in organizations. Although important in the context of decision delegation, these systems are considered more restrictive than they are creatively encouraging. Therefore, further research can explore additional variables to better understand the influence of boundary systems on innovation.

3. The Influence of Management Innovation on Organizational Performance

In accordance with the findings of Baird et al. (2019), this study also shows that management innovation has a positive effect on organizational performance, especially through the implementation of management accounting practices. A number of previous studies (Adelana, 2024; Zakaria, 2021; Adu-Gyamfi et al., 2020; Betinah et al., 2018; and others) also prove a significant relationship between PAM and increased organizational performance.

In this study, management innovation is shown to play an important role in strategic planning and control. By adopting innovative managerial techniques, organizations can improve their operational processes and achieve more optimal results. The more intensively management innovation practices are implemented, the greater their contribution to improving performance.

4. The Influence of LOC on Organizational Performance through Management Innovation Mediation

According to Baird et al. (2019), constraining control can indirectly affect organizational performance through management innovation. This study tested two systems in constraining control and found that:

• The boundary system, although mediated by management innovation, still does not show a significant influence on organizational performance.

- Diagnostic control systems, on the other hand, have a positive influence on organizational performance through the mediation of management innovation, indicating that innovation is an important link between control systems and performance.

This finding reinforces the view that LOC is more effective when implemented comprehensively (Ratmono, 2020), rather than partially. In the context of a heavy equipment company that has many branches, a boundary system is needed to ensure the alignment of decisions taken in the field with central policies. However, in practice, the boundary system is not enough to encourage innovation or performance if it is not accompanied by other control systems.

Diagnostic control systems, as a monitoring and evaluation tool, have proven effective in improving performance when combined with strategic management practices such as benchmarking, activity-based costing, balanced scorecard, total quality management, and key performance indicators. PAM support in decision making, cost control, and performance assessment makes innovation in management accounting one of the important factors in improving organizational effectiveness (Hariadi et al., 2020).

However, these results are still preliminary. Therefore, it is recommended that further research further explore the mediating role of certain managerial techniques in the relationship between LOC control systems and organizational performance achievement.

**CONCLUSION**

This study emphasizes the importance of implementing enabling and constraining controls in relation to management innovation and organizational performance. Enabling controls encourage positive behavior in the organization through the formation of strong internal values and comprehensive communication and integration. Conversely, constraining controls serve to provide limiting pressure, but are still needed to maintain effectiveness and efficiency through the formation of boundaries and performance monitoring.

Based on the results of data processing, the following conclusions were obtained:

1. Enabling controlproven to have a direct influence on organizational performance, reflecting that the strategic direction and organizational learning facilitated by this control can provide positive impetus to performance achievement.

2. Limitation systemdoes not have a significant direct impact on organizational performance, but is still needed as a boundary setting in decision making, especially in the process of delegating authority.

3. Diagnostic control systemalso does not have a direct impact on organizational performance, although it remains important in carrying out monitoring and evaluation functions to support performance improvements.

4. Limitation systemdoes not show a direct influence on management innovation, which indicates that behavioral restrictions in organizations do not necessarily encourage the creation of innovation.

5. Diagnostic control systemshows a direct and significant influence on management innovation, indicating the importance of performance appraisal and feedback as supporting factors for the implementation of innovative managerial techniques.

6. Management innovationdirectly affect organizational performance, primarily through the application of management accounting practices that support strategic planning, control, and decision-making processes.

7. Limitation system, although mediated by management innovation, still does not show a significant effect on organizational performance, indicating that behavioral constraints are not sufficient to significantly drive performance outcomes.

8. Diagnostic control system, when mediated by management innovation, has a significant effect on organizational performance, indicating that implementing this system together with innovative management techniques can improve organizational performance.

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