

THE INFLUENCE OF TRANSFORMATIONAL LEADERSHIP AND ORGANIZATIONAL CULTURE ON ORGANIZATIONAL INNOVATION WITH ORGANIZATIONAL LEARNING AND KNOWLEDGE ACQUISITION AS MEDIATORS AND ITS IMPACT ON BUSINESS SUSTAINABILITY (A STUDY ON COAL MINING SECTOR COMPANIES IN INDONESIA)

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Abstract

This study examines the impact of Transformational Leadership and Organizational Culture on Organizational Learning, Knowledge Acquisition, and Organizational Innovation, and how these factors collectively contribute to Business Sustainability within Indonesia's coal mining sector. The research aims to address gaps in existing literature regarding the influence of leadership styles and organizational culture on innovation in this unique industry context. Using a quantitative approach, the study analyzes data collected through surveys distributed to companies listed in the Indonesian Coal Mining Association (APBI) in 2024. The results indicate that Transformational Leadership and Organizational Culture have a significant positive effect on Organizational Learning, Knowledge Acquisition, and Organizational Innovation, which in turn support Business Sustainability. The study employs Structural Equation Modeling (SEM) to evaluate the relationships between the variables. Findings highlight that fostering a culture of collaboration and trust (Clan Culture) and strong transformational leadership can enhance innovation and knowledge acquisition, contributing to the long-term sustainability of coal mining companies. The study offers theoretical contributions to the fields of leadership, organizational culture, and sustainability, with practical implications for business leaders, policymakers, and investors seeking to improve sustainability practices in the mining sector. However, limitations include the online survey distribution method and the lack of consideration for company size, which may affect the generalizability of the results.

Keywords: Transformational Leadership, Organizational Culture, Organizational Learning, Knowledge Acquisition, Organizational Innovation, Business Sustainability, Coal Mining, Indonesia.

1. INTRODUCTION

The concept of sustainability has become a critical focus in corporate innovation activities, particularly within the mining sector. As sustainability is increasingly recognized not just as a social responsibility but also as a driver of innovation, companies in the coal mining industry are confronted with the need to balance economic growth with environmental and social considerations (Ardito, 2023; Cillo et al., 2019). The importance of innovation in business sustainability has been widely discussed in literature, with leadership and organizational

culture identified as key factors influencing organizational learning, knowledge acquisition, and innovation (Moradi et al., 2021; Coffay & Bocken, 2023). However, challenges in achieving sustainability through innovation demand strong organizational control to formulate strategic guidance and align goals (Cardinal et al., 2017; Ouchi, 1979). This research is significant as it explores the dynamic interplay between transformational leadership, organizational culture, and business sustainability within Indonesia's coal mining sector. Despite the growing interest in organizational innovation and its relationship with sustainability, many studies have not fully addressed how transformational leadership and organizational culture act as catalysts for innovation in the context of Indonesian mining companies. This study aims to fill the gap by providing a comprehensive understanding of how leadership styles and organizational culture shape organizational innovation, with organizational learning and knowledge acquisition serving as mediators (Rauter et al., 2023). The main problem addressed in this research is the lack of empirical studies that investigate the interactions between transformational leadership, organizational culture, organizational learning, knowledge acquisition, organizational innovation, and business sustainability, particularly within the coal mining industry. Existing studies have often focused on these variables in other sectors or isolated contexts, which limits the understanding of their combined impact on business sustainability in the mining industry (Özgül & Zehir, 2023; Moradi et al., 2021). Additionally, there is a need for clearer insights into how organizational learning and knowledge acquisition influence the innovation process in this sector (Chatzoglou & Dimitrios, 2018).

The research gap lies in the limited exploration of how transformational leadership and organizational culture influence innovation within the unique operational and regulatory environment of coal mining in Indonesia. While some studies have addressed these variables, few have examined their comprehensive effects in the mining sector, especially considering the dynamic challenges it faces, such as environmental concerns and regulatory pressures (Pietrobelli et al., 2018; Gruenhagen & Parker, 2020). This gap highlights the need for a more targeted investigation of these factors in Indonesian coal mining companies. Therefore, the aim of this research is to examine the influence of transformational leadership and organizational culture on organizational innovation, with organizational learning and knowledge acquisition as mediators, and assess their impact on business sustainability. This study not only aims to contribute to the theoretical understanding of these relationships but also seeks to provide practical insights for improving innovation strategies in the Indonesian coal mining sector, fostering long-term business sustainability.

2. LITERATURE REVIEW

2.1. Transformational Leadership

The Knowledge-Based View (KBV) theory and Knowledge Management (KM) theory provide a foundation for understanding the link between Transformational Leadership and Organizational Learning. KBV sees knowledge as a strategic asset for competitive advantage, while Transformational Leadership encourages employees to explore, share, and develop

knowledge, which is essential for Organizational Learning. KM emphasizes systematic knowledge management, with Transformational Leadership promoting a collaborative learning culture. Research by Zhang et al. (2022) shows that Transformational Leadership boosts Organizational Learning in public service organizations. This aligns with studies by Özgül and Zehir (2023) and Vu (2023), which indicate that effective Transformational Leadership influences Organizational Learning behaviors. This supports the hypothesis that Transformational Leadership positively impacts Organizational Learning.

Furthermore, Ugwu and Okore (2020) found that Transformational Leadership significantly affects Knowledge Acquisition, a result supported by Nabi et al. (2021) and Khatri et al. (2023). These findings suggest that Transformational Leadership can drive Knowledge Acquisition in organizations, providing a basis for the hypothesis that it influences Knowledge Acquisition.

On the other hand, Begum et al. (2020) showed that Transformational Leadership impacts Sustainable Organizational Innovation, while Jabbar (2022) found a strong link between Transformational Leadership and Organizational Innovation. Both studies underline that Transformational Leadership is a key driver of Organizational Innovation, supporting the hypothesis that it influences Organizational Innovation. The research hypothesis is articulated as follows based on this description:

- H1: Transformational Leadership has a positive and significant effect on Organizational Learning.
- H2: Transformational Leadership has a positive and significant effect on Knowledge Acquisition.
- H3: Transformational Leadership has a positive and significant effect on Organizational Innovation.

2.2. Organizational Culture

The influence of Organizational Culture on Organizational Learning can be analyzed through the Knowledge-Based View (KBV) and Knowledge Management (KM) theories. KBV highlights that a culture promoting knowledge exchange and collaboration supports the development of organizational knowledge, which is essential for Organizational Learning. KM emphasizes the importance of effective knowledge management in facilitating Organizational Learning through practices like knowledge sharing and dissemination. Research by Hosseini et al. (2020) shows a significant positive impact of Organizational Culture on Organizational Learning, supported by studies by Shahriar and Allameh (2020) and Al Dari et al. (2021). These findings suggest that Organizational Culture plays a crucial role in enhancing Organizational Learning, providing a strong basis for hypothesizing its influence. Studies by Phan (2021), Pivec & Sedej (2022), and Raudeliūnė & Kordab (2023) found that Organizational Culture positively influences Knowledge Acquisition. This emphasizes its importance in improving Knowledge Acquisition within organizations, supporting the hypothesis that Organizational Culture affects Knowledge Acquisition.

Kowsari et al. (2019) highlighted the role of Organizational Culture in fostering innovation, with specific cultural components like adhocracy and clan cultures positively impacting innovation. These findings, along with studies by Azeem et al. (2021) and Alateeg & Alhammedi (2024), underline that a strong organizational culture drives innovation, suggesting that Organizational Culture significantly influences Organizational Learning. This research, the following study hypothesis is developed using this description, and it is well supported by the results of prior studies:

H4: Organizational Culture has a positive and significant effect on Organizational Learning.

H5: Organizational Culture has a positive and significant effect on Knowledge Acquisition.

H6: Organizational Culture has a positive and significant effect on Organizational Innovation.

2.3. Organizational Learning

The influence of Organizational Learning on Knowledge Acquisition can be viewed through the Knowledge-Based View (KBV) and Knowledge Management (KM) perspectives. KBV sees knowledge as a strategic resource for long-term success, while Organizational Learning involves acquiring and understanding new knowledge, central to Knowledge Acquisition. KM highlights the importance of systematic processes in managing knowledge, enabling organizations to acquire and integrate new knowledge, enhancing learning and supporting innovation. Kordab et al. (2020), Rehman et al. (2021), and Al-Sulami et al. (2022) found that Organizational Learning positively influences Knowledge Acquisition, indicating that a strong Organizational Learning culture drives knowledge acquisition. This supports the hypothesis that Organizational Learning affects Knowledge Acquisition in organizations. Additionally, Toe & Tantasanee (2021), Punyasai et al. (2022), and Inthavong et al. (2023) found that Organizational Learning positively impacts Organizational Innovation, which boosts company performance. These studies provide a solid basis for hypothesizing that Organizational Learning influences Organizational Innovation. The findings also support studies on Organizational Learning and Organizational Innovation. The research hypothesis is formulated as follows in light of this explanation:

H7: Organizational Learning has a positive and significant effect on Knowledge Acquisition.

H8: Organizational Learning has a positive and significant effect on Organizational Innovation.

2.4. Knowledge Acquisition

The influence of Knowledge Acquisition on Organizational Innovation can be analyzed through Knowledge Management (KM) and Knowledge-Based View (KBV). KBV sees knowledge as a crucial strategic resource for maintaining competitive advantage, while Knowledge Acquisition is essential for developing an organization's knowledge base. KM emphasizes the need for a systematic process to manage acquired knowledge, enabling its application in creating and implementing innovation. Research by Kim et al. (2020), Ngoc Thang & Anh Tuan (2020), and Aida & Boudabbous (2023) shows that Knowledge Acquisition significantly influences Organizational Innovation. These findings suggest that

effectively implementing Knowledge Acquisition drives innovation, supporting the hypothesis that Knowledge Acquisition impacts Organizational Innovation in organizations.. Based on the description and support from the previous studies, the research hypothesis about Knowledge Acquisition that affects Organizational Innovation is formulated, namely:

H9: Knowledge Acquisition has a positive and significant effect on Organizational Innovation.

2.5. Organizational Innovation

The influence of Organizational Innovation on Business Sustainability can be viewed through Knowledge Management (KM) and Knowledge-Based View (KBV). Organizational Innovation, which involves implementing new ideas, relies on managing and leveraging knowledge effectively. KM emphasizes the importance of systematic processes to acquire, store, and share knowledge, ensuring innovation becomes integral to business strategy and sustainability. Research by Moradi et al. (2021), Coffay & Bocken (2023), and Rauter et al. (2023) shows a positive relationship between Organizational Innovation and Business Sustainability, highlighting that the capabilities of Organizational Innovation influence its impact on business sustainability. These studies support the hypothesis that Organizational Innovation positively affects Business Sustainability in organizations. Based on the description and support from the previous studies, the research hypothesis about Organizational Innovation that affects Business Sustainability is formulated, namely:

H10: Organizational Innovation has a positive and significant effect on Business Sustainability.

Based on formulated hypothesis, the researcher developed the research model as shown in Figure 1.

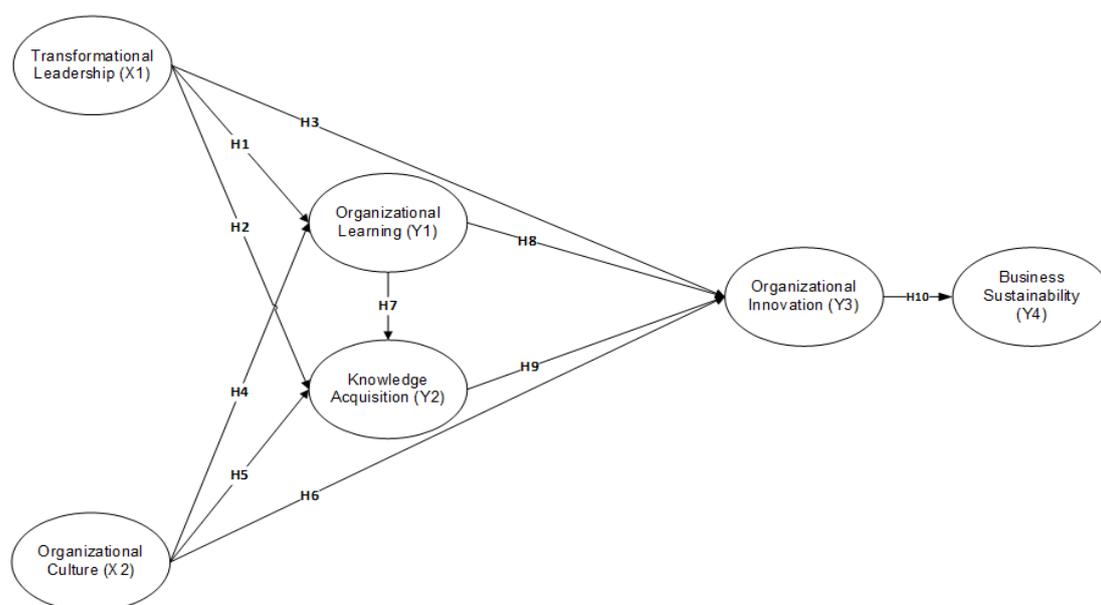


Figure 1: Research Model

3. METHOD

This study uses a quantitative approach that is systematic, planned, and structured. It is called a quantitative approach because the data collected is numerical and analyzed using statistical methods. According to Sugiyono (2013), the quantitative approach is used to investigate a population using specific sampling techniques, collect data using research instruments, and apply quantitative/statistical data analysis to test the hypotheses that have been established.

3.1. Instrument Design

In this study, a survey method is used as part of the quantitative approach, where a sample is taken from the population through the distribution of questionnaires to respondents. The questionnaire instrument is structured with indicators and statements for each variable, based on the operational definitions of the variables. The statements in the questionnaire are designed based on the Likert scale model, using 5 response levels rated from 1 (strongly disagree) to 5 (strongly agree). The questionnaire instrument consists of 6 research variables and 77 items derived from previous studies to ensure the content validity of each item. The 6 variables include two independent variables—transformational leadership and organizational culture—and four dependent variables—organizational learning, knowledge acquisition, organizational innovation, and business sustainability. Items for the transformational leadership variable were obtained from Kılıç & Uludag (2021); organizational culture items were adapted from Al Dari et al. (2020); organizational learning items were modified from Jyothibabu et al. (2010); knowledge acquisition items were obtained from Lo'pez et al. (2005); organizational innovation items were adapted from Kim et al. (2020); and business sustainability items were modified from Li et al. (2020). A pre-test was conducted with 30 respondents to assess the validity and reliability of the questionnaire before distribution. To evaluate the research instrument, validity and reliability tests were performed to ensure the trustworthiness of the items. Validity was tested by calculating the correlation between the score of each question and the corrected total score using Pearson correlation analysis, while reliability was measured using Cronbach's Alpha value. The results indicated that the items for each variable satisfied the validity requirements, ranging from 0.352 to 0.621 as evidenced by the value of $r_{\text{arithmetic}} > r_{\text{table}} (0.3)$. The value of Cronbach's alpha for assessing reliability is between the values of 0.788 and 0.895, indicating that all items are reliable since it is greater than 0.600. Thus, the instrument can be employed for data collection with these provisions.

3.2. Data Collection & Analysis

The designed questionnaire instrument is used to evaluate the previously determined research variables. The questionnaire was created as a Google Form, and the link was sent via email, group chat, and personal messages by the researcher to the operational managers of companies in the coal mining industry. The population for this study consists of all mining companies listed in the Indonesian Coal Mining Association (APBI) in 2024. Based on this category, a total population of $N = 155$ companies was identified. In this study, the sampling technique used is non-probability sampling, specifically saturated sampling, where all companies

registered in the APBI are used as the sample units. To determine the appropriate number of participants for the study, we referred to Pinem et al. (2018) as a latent variable, and then multiplied it by the largest indicator of variables, which is 10 (Urbach & Ahlemann, 2010). With four independent factors resulting in latent variables, the minimum sample size for this study is forty. Therefore, the data meets the minimum sample size requirement. The research is conducted over a period from June to July 2024, during which primary data, consisting of assessments or perceptions from respondents, is collected. For data analysis, descriptive statistical analysis is used to summarize and describe the basic characteristics of the dataset or sample, while multivariate analysis using Structural Equation Modeling (SEM), specifically Partial Least Squares (PLS), is employed to examine the relationships between variables in a complex model. The choice of PLS-SEM is particularly suitable for small sample sizes and can handle non-normally distributed data, making it flexible in various research conditions (Hair et al., 2017). In this study, data is analyzed using SmartPLS software, which facilitates comprehensive SEM analysis and is user-friendly for researchers. Following Anderson and Gerbing (1988), before proceeding to the structural model, this study first thoroughly examined the measurement model (Ali et al., 2019; Foroughi et al., 2019).

Table 1: Respondent Characteristics.

Respondent Characteristics	Frequency	Percentage (%)	
Age	22-26 Years	2	1,29
	27-31 Years	6	3,87
	32-36 Years	22	14,19
	37-41 Years	31	20,00
	42-46 Years	33	21,29
	47-51 Years	23	14,84
	52-56 Years	33	21,29
	57-61 Years	5	3,23
Gender	Man	130	83,87
	Woman	25	16,13
Length of Service	1 - 2	59	38,06
	3 - 4	19	12,26
	5 - 6	41	26,45
	7 - 8	14	9,03
	9 - 10	12	7,74
	11 - 12	7	4,52
	13 - 14	2	1,29
	15 - 16	1	0,65
Tenure or Work Period	1 - 3	13	8,39
	4 - 6	9	5,81
	7 - 9	26	16,77
	10 - 12	51	32,90
	13 - 15	48	30,97
	16 - 18	4	2,58
	19 - 21	4	2,58
	22 - 24	0	0,00
Education	Bachelor	87	56,13
	Master	66	42,58
	Ph.D	2	1,29

The respondent characteristics show that most participants are in the age range of 37-56 years, with the highest frequency in the 42-46 years and 52-56 years age groups, each at 21.29%. The majority of respondents are male, comprising 83.87% of the total, while females account for only 16.13%. Regarding tenure, the largest group of respondents has been in their position for 1-2 years (38.06%), followed by those with 5-6 years of tenure (26.45%). Most respondents have worked for 10 to 15 years, with 32.90% having 10-12 years of service and 30.97% having 13-15 years. In terms of education, the majority hold a bachelor's degree (56.13%), followed by those with a master's degree (42.58%), and very few hold a doctoral degree (1.29%).

4. RESULT AND DISCUSSIONS

4.1. Results

The first result provided an analysis of the measurement model, which assessed the validity and reliability of the components. The second result demonstrated how a structural model analysis was employed to test ten research hypotheses.

4.1.1. Measurement Model

As part of the development of the measurement model, the six research constructs were tested for reliability and convergent validity. Composite Reliability and Cronbach's Alpha were used to assess reliability, while AVE and Outer Loading were employed to determine convergent validity. According to Hair Joseph et al. (2010), Table 2 presents the results, showing that each item had an outer loading value greater than 0.70, the average variance extracted (AVE) exceeded 0.50, and both Cronbach's alpha and Composite Reliability (CR) surpassed 0.70, confirming that the convergent validity and reliability tests were satisfactory.

Table 2: The Results of Measurement Models.

Variables	Indicator	Item	Outer Loading	Composite Reliability	Cronbach's Alpha	Average Variance Extracted
<i>Transformational Leadership (X1)</i>	X1.1	X1.1.2	0,744	0,900	0,860	0,642
		X1.1.3	0,858			
		X1.1.4	0,815			
		X1.1.5	0,797			
		X1.1.6	0,788			
	X1.2	X1.2.1	0,835	0,888	0,843	0,615
		X1.2.2	0,787			
		X1.2.3	0,749			
		X1.2.4	0,800			
		X1.2.5	0,746			
	X1.3	X1.3.1	0,726	0,871	0,815	0,576
		X1.3.2	0,804			
		X1.3.3	0,783			
		X1.3.4	0,754			
		X1.3.5	0,723			

Variables	Indicator	Item	Outer Loading	Composite Reliability	Cronbach's Alpha	Average Variance Extracted
	X1.4	X1.4.1	0,732	0,864	0,791	0,614
		X1.4.2	0,778			
		X1.4.3	0,806			
		X1.4.4	0,815			
<i>Organizational Culture (X2)</i>	X2.1	X2.1.1	0,771	0,869	0,773	0,689
		X2.1.2	0,866			
		X2.1.3	0,849			
	X2.2	X2.2.1	0,709	0,861	0,798	0,553
		X2.2.2	0,781			
		X2.2.3	0,776			
		X2.2.4	0,714			
		X2.2.5	0,735			
<i>Organizational Learning (Y1)</i>	Y1.1	Y1.1.1	0,734	0,872	0,804	0,631
		Y1.1.2	0,798			
		Y1.1.3	0,863			
		Y1.1.4	0,776			
	Y1.2	Y1.2.1	0,749	0,876	0,811	0,639
		Y1.2.2	0,829			
		Y1.2.3	0,851			
		Y1.2.4	0,764			
	Y1.3	Y1.3.1	0,746	0,879	0,817	0,646
		Y1.3.2	0,803			
		Y1.3.3	0,833			
		Y1.3.4	0,829			
<i>Knowledge Acquisition (Y2)</i>	Y2.1	Y2.1.1	0,821	0,856	0,748	0,665
		Y2.1.2	0,779			
		Y2.1.3	0,845			
	Y2.2	Y2.2.1	0,773	0,855	0,746	0,664
		Y2.2.2	0,843			
		Y2.2.3	0,826			
<i>Organizational Innovation (Y3)</i>	Y3.1	Y3.1.1	0,757	0,771	0,770	0,592
		Y3.1.2	0,780			
		Y3.1.3	0,768			
		Y3.1.5	0,770			
	Y3.2	Y3.2.1	0,760	0,809	0,808	0,635
		Y3.2.2	0,817			
		Y3.2.4	0,808			
		Y3.2.5	0,801			
	Y3.3	Y3.3.1	0,791	0,765	0,764	0,680
		Y3.3.3	0,850			
Y3.3.4		0,831				
<i>Business Sustainability (Y4)</i>	Y4.1	Y4.1.1	0,802	0,872	0,870	0,720
		Y4.1.2	0,861			
		Y4.1.3	0,869			
		Y4.1.4	0,861			
		Y4.2.1	0,804	0,817	0,815	0,644

Variables	Indicator	Item	Outer Loading	Composite Reliability	Cronbach's Alpha	Average Variance Extracted
	Y4.2	Y4.2.2	0,791			
		Y4.2.3	0,839			
		Y4.2.4	0,773			
	Y4.3	Y4.3.1	0,808	0,764	0,762	0,677
		Y4.3.2	0,839			
		Y4.3.3	0,820			

Additionally, the discriminant validity of the variables was evaluated using the Heterotrait-Monotrait ratio (HTMT). All HTMT values between indicators were below the threshold of 0.90, indicating that each indicator has adequate discriminant validity. This means that each indicator effectively reflects the construct being measured without significant influence from other indicators. This confirms that the criteria for convergent validity have been met. Therefore, the evaluation can proceed to the next stage, which is the structural model evaluation.

4.1.2. Structural Model

Figure 1 illustrates the study model used for the structural model evaluation, which examined the relationships between the proposed constructs. R² and the significance of Path analysis were conducted to provide empirical evidence for the hypothesis (Santhanamery & Ramayah, 2014). The R-Square value is used to determine how much of the variation in the dependent variable can be explained by the independent variables. The higher the R-Square value, the better the model's ability to predict relationships between variables. Chin (1998) explains the criteria for R-Square values in three classifications: 0.67 as substantial, 0.33 as moderate, and 0.19 as weak.

Table 3: The Value of R² (Determination Coefficient).

Endogenous Latent Variable	R-squared
Organizational Learning (Y1)	0,433
Knowledge Acquisition (Y2)	0,421
Organizational Innovation (Y3)	0,374
Business Sustainability (Y4)	0,478

Table 3 shows that Organizational Learning (Y1) has an R-Square value of 0.433, meaning that 43.3% of the variation in this variable can be explained by the independent variables. Knowledge Acquisition (Y2) has an R-Square value of 0.421, indicating that 42.1% of the variation is explained by the independent variables. Organizational Innovation (Y3) has an R-Square value of 0.374, meaning that 37.4% of the variation in organizational innovation can be explained by the relevant variables. Business Sustainability (Y4) has the highest R-Square value at 0.478, showing that 47.8% of this variable is influenced by other variables in the model. Overall, these R-Square values indicate that the model has a moderate or reasonably good ability to explain the variability of each dependent variable.

The path coefficient value (H) and significance (P-Value) need to be sufficiently high to validate the proposed hypotheses for testing the ten (10) hypotheses within this structural model. A high path coefficient indicates the strength of the relationship between two variables (Hair Joseph et al., 2010). A path coefficient greater than 0.1 and a p-value less than 0.05 are required for significance. Table 4 shows that the direct effect testing in this study involves 2 independent variables and 4 dependent variables. These variables form 10 direct relationships, meaning 10 hypotheses will be tested.

Table 4: Hypothesis Test Results

Hypothesis	Variables	Beta	T-Statistic	P-Value	Conclusion
H1	Transformational Leadership (X1) → Organizational Learning (Y1)	0,261	3,377	0,001	Significant
H2	Transformational Leadership (X1) → Knowledge Acquisition (Y2)	0,186	2,607	0,009	Significant
H3	Transformational Leadership (X1) → Organizational Innovation (Y3)	0,184	2,136	0,035	Significant
H4	Organizational Culture (X2) → Organizational Learning (Y1)	0,465	6,234	0,000	Significant
H5	Organizational Culture (X2) → Knowledge Acquisition (Y2)	0,230	2,713	0,007	Significant
H6	Organizational Culture (X2) → Organizational Innovation (Y3)	0,206	2,162	0,031	Significant
H7	Organizational Learning (Y1) → Knowledge Acquisition (Y2)	0,420	4,909	0,000	Significant
H8	Organizational Learning (Y1) → Organizational Innovation (Y3)	0,243	2,501	0,013	Significant
H9	Knowledge Acquisition (Y2) → Organizational Innovation (Y3)	0,352	3,761	0,000	Significant
H10	Organizational Innovation (Y3) → Business Sustainability (Y4)	0,692	16,454	0,000	Significant

4.2. Discussion

4.2.1. Hypothesis 1: The Influence of Transformational Leadership on Organizational Learning

The results of the hypothesis testing in this study indicate that Transformational Leadership has a positive and significant effect on Organizational Learning, with a beta value of 0.261, T-statistic of 3.377, and a p-value of 0.001. Based on these results, hypothesis H1 is accepted, meaning that the higher the level of Transformational Leadership, the higher the level of Organizational Learning. According to the Knowledge-Based View (KBV) theory proposed by Grant (1996), knowledge is considered a strategic asset that can create sustainable competitive advantage for organizations. KBV emphasizes the importance of organizational learning in managing, creating, and utilizing knowledge. In this context, Transformational Leadership plays a crucial role in encouraging the exploration of new knowledge, the development of innovative ideas, and collaborative learning that supports Organizational Learning.

In the context of coal mining companies in Indonesia, strengthening Transformational Leadership can be an effective strategy to enhance organizational learning. Leaders who emphasize Inspirational Motivation as a dominant indicator can motivate employees to learn and adapt quickly to changes in the business environment. The findings of this study support several theories from previous research. Zhang et al. (2022) explained that Transformational Leadership significantly contributes to Organizational Learning. Additionally, this research also supports the findings of Özgül and Zehir (2023), which show that transformational leadership style has a positive impact on organizational learning orientation.

4.2.2. Hypothesis 2: The Influence of Transformational Leadership on Knowledge Acquisition

The results of the hypothesis testing in this study indicate that Transformational Leadership has a positive and significant effect on Knowledge Acquisition, with a beta value of 0.186, T-statistic of 2.607, and a p-value of 0.009. Based on these results, hypothesis H2 is accepted, meaning that the higher the level of Transformational Leadership, the higher the level of Knowledge Acquisition. Transformational Leadership helps create an environment that encourages the search for and acquisition of new knowledge, both from external and internal sources. It not only builds trust among employees but also fosters a collaborative culture that prioritizes knowledge innovation as part of the organization's strategy.

In the context of coal mining companies in Indonesia, the influence of Transformational Leadership on Knowledge Acquisition is highly relevant for improving competitiveness amid the dynamic changes in the industry environment. The findings of this study are consistent with previous research. Ugwu and Okore (2020) found that Transformational Leadership significantly positively impacts Knowledge Acquisition in the context of university librarians' knowledge management. Nabi et al. (2021) demonstrated that transformational leaders significantly drive knowledge acquisition by creating a work environment that supports learning and collaboration.

4.2.3. Hypothesis 3: The Influence of Transformational Leadership on Organizational Innovation

The results of the hypothesis testing in this study indicate that Transformational Leadership has a positive and significant effect on Organizational Innovation, with a beta value of 0.184, T-statistic of 2.136, and a p-value of 0.035. Based on these results, hypothesis H3 is accepted, meaning that the higher the level of Transformational Leadership, the higher the level of Organizational Innovation. Transformational leaders play a key role in creating an environment that encourages the creation, dissemination, and application of relevant knowledge to support organizational innovation.

Additionally, the Knowledge Management (KM) theory developed by Nonaka & Takeuchi (1995) emphasizes the importance of effective knowledge management in fostering organizational innovation. Transformational leaders can leverage KM to drive the development of innovative processes, market penetration, and management system renewal, enabling organizations to adapt to dynamic changes. Previous research by Begum et al. (2020)

shows that Transformational Leadership significantly impacts sustainable organizational innovation, including innovations in management and operations systems. Jabbar's (2022) research also supports this finding, concluding that transformational leaders play a role in creating an environment that supports innovation through cross-functional collaboration and the exploration of new ideas.

4.2.4. Hypothesis 4: The Influence of Organizational Culture on Organizational Learning

The results of the hypothesis testing in this study indicate that Organizational Culture has a positive and significant effect on Organizational Learning, with a beta value of 0.465, T-statistic of 6.234, and a p-value of 0.000. Based on these results, hypothesis H4 is accepted, meaning that the higher the level of Organizational Culture, the higher the level of Organizational Learning. According to the Knowledge-Based View (KBV) theory proposed by Grant (1996), a strong organizational culture can be a key driver for knowledge creation and organizational learning. A culture based on collaboration and trust, such as Clan Culture, is capable of creating a work environment that supports continuous learning.

In the context of coal mining companies in Indonesia, Organizational Culture can be implemented by strengthening a culture that promotes collaborative and structured learning. In Clan Culture, companies can implement cross-departmental training programs, such as collaborative training for exploration and production teams, to improve employees' technical skills. Previous research supports the importance of this implementation. For example, Cameron & Quinn (2011) showed that Clan Culture supports collaborative and adaptive learning, while Schein (2010) emphasized that a strong organizational culture enables more effective organizational learning in response to environmental changes.

4.2.5. Hypothesis 5: The Influence of Organizational Culture on Knowledge Acquisition

The results of the hypothesis testing in this study indicate that Organizational Culture has a positive and significant effect on Knowledge Acquisition, with a beta value of 0.230, T-statistic of 2.713, and a p-value of 0.007. Based on these results, hypothesis H5 is accepted, meaning that the higher the level of Organizational Culture, the higher the level of Knowledge Acquisition. Collaborative cultures, such as Clan Culture, encourage organizational members to share information and collaborate in identifying and utilizing new knowledge resources. On the other hand, Hierarchy Culture provides a structure that supports the systematic management of knowledge, including the acquisition and storage of relevant information for the organization's benefit.

In the context of applying Organizational Culture, Clan Culture plays a significant role in supporting External Knowledge Acquisition. This culture encourages employees to engage in strategic partnerships with external parties, such as universities and research institutions, to obtain up-to-date information relevant to the organization's needs. Additionally, Hierarchy Culture plays a key role in ensuring that Internal Knowledge Acquisition processes run efficiently, for example, through the development of internal policies that encourage innovation and data-driven learning. Previous research supports these findings. Phan (2021)

showed that collaborative-based Organizational Culture significantly impacts an organization's ability to manage external knowledge. Another study by Pivec & Sedej (2022) highlighted the importance of hierarchical structures in supporting the acquisition of internal knowledge relevant to operational needs.

4.2.6. Hypothesis 6: The Influence of Organizational Culture on Organizational Innovation

The results of the hypothesis testing in this study indicate that Organizational Culture has a positive and significant effect on Organizational Innovation, with a beta value of 0.206, T-statistic of 2.162, and a p-value of 0.031. Based on these results, hypothesis H6 is accepted, meaning that the higher the level of Organizational Culture, the higher the level of Organizational Innovation. Collaborative cultures, such as Clan Culture, create an open environment that supports the exploration of new ideas. Meanwhile, Hierarchy Culture provides a systematic structure to support innovation management, including the implementation of policies and procedures that ensure new ideas are effectively implemented.

Furthermore, Knowledge Management (KM) theory developed by Nonaka & Takeuchi (1995) explains that the process of managing knowledge, which includes acquisition, storage, and application of information, is greatly influenced by organizational culture. The combination of KBV and KM shows that Organizational Culture can be a key driver for enhancing organizational innovation capacity. In the context of coal mining companies in Indonesia, applying Organizational Culture that supports innovation can be achieved by strengthening Clan Culture to encourage collaboration and idea sharing among employees. Previous research supports this finding. Kowsari et al. (2019) showed that Organizational Culture, especially elements of adhocracy and clan culture, has a positive impact on organizational innovation levels. Other studies by Azeem et al. (2021) and Alateeg & Alhammadi (2024) highlight the importance of organizational culture structures in promoting sustainable innovation.

4.2.7. Hypothesis 7: The Influence of Organizational Learning on Knowledge Acquisition

The results of the hypothesis testing in this study indicate that Organizational Learning has a positive and significant effect on Knowledge Acquisition, with a beta value of 0.420, T-statistic of 4.909, and a p-value of 0.000. Based on these results, hypothesis H7 is accepted, meaning that the higher the level of Organizational Learning, the higher the level of Knowledge Acquisition. Organizational Learning involves the process of acquiring, interpreting, and understanding new information and experiences, which is central to Knowledge Acquisition.

In the context of coal mining companies in Indonesia, the application of Organizational Learning to enhance Knowledge Acquisition can be achieved through ongoing training programs to identify and develop skills relevant to mining operations. Companies can also establish strategic partnerships with universities and research institutions to acquire knowledge on the latest mining technologies or more sustainable environmental management solutions (External Knowledge Acquisition). Furthermore, forming regular discussion forums

among teams can ensure that newly acquired knowledge is adapted and applied in daily operations (Internal Knowledge Acquisition). Previous research supports these findings. Kordab et al. (2020) showed that Organizational Learning has a significant impact on Knowledge Acquisition. Research by Rehman et al. (2021) and Al-Sulami et al. (2022) also found that organizations with a strong learning culture are more capable of managing and acquiring new knowledge, both from internal and external sources.

4.2.8. Hypothesis 8: The Influence of Organizational Learning on Organizational Innovation

The results of the hypothesis testing in this study indicate that Organizational Learning has a positive and significant effect on Organizational Innovation, with a beta value of 0.243, T-statistic of 2.501, and a p-value of 0.013. Based on these results, hypothesis H8 is accepted, meaning that the higher the level of Organizational Learning, the higher the level of Organizational Innovation. According to the Knowledge-Based View (KBV) theory proposed by Grant (1996), effective organizational learning can create a strong knowledge base, which is the foundation for innovation. In this process, Continuous Learning ensures that organizations consistently update knowledge relevant to their strategic needs.

In the context of coal mining companies in Indonesia, the application of Organizational Learning to support Organizational Innovation can be achieved through the development of ongoing training programs (Continuous Learning) to update employees' technical and managerial skills. For example, companies can introduce environmentally friendly mining methods or new automation technologies as part of their Process Innovation initiatives. Previous research supports these findings. Toe & Tantasane (2021) showed that Organizational Learning has a significant impact on Organizational Innovation. Studies by Punyasai et al. (2022) and Inthavong et al. (2023) also found that effective organizational learning enhances innovation capacity, which ultimately has a positive impact on organizational performance.

4.2.9. Hypothesis 9: The Influence of Knowledge Acquisition on Organizational Innovation

The results of the hypothesis testing in this study indicate that Knowledge Acquisition has a positive and significant effect on Organizational Innovation, with a beta value of 0.352, T-statistic of 3.761, and a p-value of 0.000. Based on these results, hypothesis H9 is accepted, meaning that the higher the level of Knowledge Acquisition, the higher the level of Organizational Innovation. Knowledge Acquisition is the initial step in developing an organization's knowledge base, which involves collecting and integrating new knowledge from both internal and external sources. The Knowledge Management (KM) theory developed by Nonaka & Takeuchi (1995) emphasizes the importance of a systematic process to manage the acquired knowledge, including its storage and dissemination within the organization. The combination of KBV and KM theories shows that well-integrated Knowledge Acquisition can enhance an organization's capacity to create and implement innovation.

In the context of coal mining companies in Indonesia, Knowledge Acquisition plays a key role in enhancing Organizational Innovation. Companies can improve External Knowledge Acquisition by forming strategic partnerships with universities or research institutions to gain insights into the latest mining technologies or environmentally friendly approaches. Previous research supports these findings. Kim et al. (2020) demonstrated that Knowledge Acquisition has a significant impact on Organizational Innovation. Studies by Ngoc Thang & Anh Tuan (2020) and Aida & Boudabbous (2023) also found that organizations that actively manage Knowledge Acquisition are able to create innovations that support their sustainability and competitiveness.

4.2.10. Hypothesis 10: The Influence of Organizational Innovation on Business Sustainability

The results of the hypothesis testing in this study indicate that Organizational Innovation has a positive and significant effect on Business Sustainability, with a beta value of 0.692, T-statistic of 16.454, and a p-value of 0.000. Based on these results, hypothesis H10 is accepted, meaning that the higher the level of Organizational Innovation, the higher the level of Business Sustainability. According to the Knowledge-Based View (KBV) theory proposed by Grant (1996), innovation is the way organizations leverage their knowledge to create added value and competitive advantage. Organizational Innovation, whether through process, market, or management innovation, enables organizations to update their strategies and operations to ensure business sustainability.

In the context of coal mining companies in Indonesia, Organizational Innovation plays a strategic role in ensuring business sustainability. Process Innovation can be applied through the development of more efficient and environmentally friendly mining technologies, such as carbon emission reduction technologies or better waste management systems. Additionally, Market Innovation can be utilized to reach new market segments, such as the renewable energy market, which can help companies diversify their product offerings. Management Innovation can be applied by updating supply chain management systems or environmental management policies to ensure mining operations align with global sustainability standards. Previous research supports these findings. Moradi et al. (2021) showed that Organizational Innovation has a significant positive relationship with Business Sustainability. Studies by Coffay & Bocken (2023) and Rauter et al. (2023) also found that organizations actively engaged in innovation demonstrate better business sustainability performance, in terms of financial, social, and environmental aspects.

5. CONCLUSION

This study shows that Transformational Leadership and Organizational Culture have a significant positive effect on Organizational Learning, Knowledge Acquisition, and Organizational Innovation, which in turn support Business Sustainability. These findings reinforce previous research indicating that transformational leadership and organizational culture that foster learning, openness, and innovation play a crucial role in driving adaptability and business sustainability. Additionally, the processes of organizational learning and

knowledge acquisition were found to strengthen innovation, ultimately enhancing company sustainability. This research makes a significant theoretical contribution to the development of theories in the fields of leadership, organizational culture, and business sustainability. From an ontological perspective, this study deepens our understanding of the role of transformational leadership and organizational culture in driving organizational learning and innovation, which in turn contribute to business sustainability in the mining sector. From an epistemological perspective, the study strengthens the Knowledge-Based View (KBV) theory by showing how knowledge acquisition enhances innovation and sustainability. Axiologically, this research provides practical benefits for company leaders to design managerial strategies that support knowledge management and create a sustainable culture of innovation. Practically, this study offers guidance for companies, governments, and investors to improve business sustainability in the mining sector. For companies, the findings suggest concrete steps to strengthen transformational leadership and organizational culture, such as leadership training and knowledge-sharing programs. Governments can use these findings to formulate policies that promote innovation and knowledge management, as well as create regulations that support sustainability in the mining sector.

However, this study has some limitations that should be noted. First, the questionnaire distribution was conducted online, which limited the researcher's ability to provide direct explanations if respondents had questions regarding the content of the questionnaire. This could affect respondents' understanding, as they might be confused or interpret certain questions differently, which could not be immediately clarified. Second, the research sample includes all companies listed in the Indonesian Coal Mining Association (APBI) without considering the size of the companies. Differences in company size can influence organizational culture, which in turn may affect the results of the study, meaning that the generalizability of these findings may be limited when considering the size differences among companies.

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