

The Mediating Effect of Job Satisfaction on the Relationship Between Leadership Styles and Employee Loyalty

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ABSTRACT

Employee loyalty is one of the key factors influencing the stability of organizational work systems. However, in practice, employee loyalty is often influenced by the leadership styles implemented within the organization. This study aims to analyze the influence of leadership styles (transformational, transactional, democratic, and autocratic) on employee loyalty by considering job satisfaction as a mediating variable. The research was conducted in the additive manufacturing industry in Batam, involving 163 respondents. Data were collected through questionnaires and analyzed using Partial Least Squares-Structural Equation Modeling (PLS-SEM). The results indicate that transformational, transactional, and autocratic leadership styles have a positive and significant effect on job satisfaction, while democratic leadership does not. Furthermore, job satisfaction has a strong positive effect on employee loyalty and fully mediates the relationship between leadership styles and employee loyalty. None of the leadership styles directly influence employee loyalty. The study concludes that transactional leadership is the most effective style to boost job satisfaction and, consequently, employee loyalty in this industrial context.

Keywords: *Employee Loyalty, Job Satisfaction, Leadership Style, PLS-SEM, Additive Manufacturing*

Introduction

Employee loyalty has become an important issue in human resource management because organizations increasingly recognize that retaining committed employees is essential for maintaining organizational sustainability and competitiveness [1]. Employee loyalty is closely associated with employees' willingness to remain with the organization and continue contributing to organizational goals [2]. Furthermore, satisfied employees are more likely to develop stronger loyalty toward their organizations, indicating that employee satisfaction represents an important antecedent of employee loyalty [2]. Therefore, identifying organizational factors that strengthen employee loyalty remains an important concern for both researchers and practitioners.

Organizations continuously seek to improve their organizational effectiveness by developing and maintaining quality of the human resources [3]. In addition to achieving the quality of human resources, organizations are also expected to retain employees who are willing to remain committed and contribute to organizational goals over the long term [1]. This challenge is particularly relevant in Indonesia's additive manufacturing industry, where organizations rely on technically skilled employees who are required to operate advanced manufacturing technologies with high precision, comply with standardized operating procedures, and maintain strict quality and safety standards throughout the production process. The loss of experienced employees may disrupt operational continuity, reduce production efficiency, and require substantial time and resources to develop equivalent technical competencies among new employees. Consequently, retaining loyal employees becomes essential for sustaining operational performance and organizational competitiveness [2].

Leadership has long been recognized as one of the primary organizational factors influencing employees attitudes and workplace behaviors [4]. Leaders influence not only employees' task performance but also their perceptions of the work environment, organizational support, and interpersonal relationships [5]. Consequently, leadership has been associated with various employee outcomes, including job satisfaction, organizational commitment, employee engagement, and employee loyalty (Eliyana et al., 2019). Because different leadership styles emphasize different approaches to directing and interacting with employees, their effects on employee attitudes may also differ [6].

Among various leadership styles, transformational leadership has consistently been associated with positive employee attitudes because transformational leaders motivate employees through inspirational motivation, intellectual stimulation, individualized consideration, and idealized influence [3], [7], [8]. Transactional leadership, in contrast, focuses on contingent rewards and performance monitoring to achieve organizational objectives [3], [8], [9]. Democratic leadership emphasizes employee participation in decision-making, whereas autocratic leadership relies on centralized authority, close supervision, and compliance with organizational rules [6], [10], [11]. An autocratic leadership style is characterized by centralized decision-

making, strict supervision of subordinates, and minimal employee involvement [12], [13]. These conceptual differences suggest that employees may respond differently to each leadership style, resulting in different levels of job satisfaction and employee loyalty.

Despite the extensive attention given to leadership, previous empirical findings remain inconsistent. Transformational leadership has frequently been reported to improve employee job satisfaction and other positive organizational outcomes [3], [4]. However, recent evidence indicates that authoritarian or autocratic leadership should not always be regarded as detrimental because its effectiveness depends on organizational context, work characteristics, and cultural conditions [6]. Likewise, transactional leadership may generate favorable employee outcomes in organizations characterized by structured work processes and clearly defined performance expectations [14]. These inconsistent findings indicate that leadership styles may influence employee loyalty through indirect rather than purely direct relationships. These inconsistencies also suggest that examining leadership styles separately may not fully explain how leadership influences employee loyalty across different organizational contexts.

Job satisfaction has frequently been proposed as the key psychological mechanism through which leadership behaviors influence employee attitudes and behavioral outcomes [5], [15], [16], [17]. Drawing upon Social Exchange Theory, employees tend to reciprocate supportive leadership by developing positive attitudes toward both their jobs and their organizations [4]. According to Social Exchange Theory, leadership behaviors represent organizational resources that employees evaluate through daily interactions with their supervisors [18]. When employees perceive leadership behaviors as supportive, fair, and beneficial, they reciprocate by developing positive work-related attitudes, particularly job satisfaction [19]. This positive evaluation subsequently encourages employees to remain committed to the organization, thereby strengthening employee loyalty. Therefore, Social Exchange Theory provides a theoretical explanation for positioning job satisfaction as the mediating mechanism through which leadership styles influence employee loyalty. Empirical evidence demonstrates that transformational leadership improves employee job satisfaction by fostering a positive employee relations climate [4], while higher job satisfaction subsequently strengthens employees' willingness to remain with the organization [2]. These findings indicate that job satisfaction may explain why different leadership styles produce different levels of employee loyalty. However, empirical evidence remains limited regarding whether job satisfaction performs a similar mediating role across different leadership styles within a single research model.

Although previous studies have examined the relationships among leadership, job satisfaction, and employee loyalty, several important gaps remain. First, existing studies have predominantly focused on a single leadership style, particularly transformational or transactional leadership, whereas studies simultaneously comparing transformational, transactional, democratic, and autocratic leadership remain limited. Second, previous research has mainly investigated the direct effects of leadership on employee loyalty, with relatively little attention given to the mediating role of job satisfaction across multiple leadership styles within a unified structural model. Third, empirical evidence from Indonesia's additive manufacturing industry remains scarce despite its unique operational characteristics, including standardized production processes, strict quality requirements, and intensive supervisory practices. Therefore, this study simultaneously examines four leadership styles while investigating the mediating role of job satisfaction in explaining employee loyalty among employees working in Indonesia's additive manufacturing industry. Accordingly, this study extends existing leadership research by demonstrating how different leadership styles operate through job satisfaction to influence employee loyalty within a single structural model.

Research Method

This study employed a quantitative research approach using a cross-sectional survey design to examine the relationships among leadership styles, job satisfaction, and employee loyalty in Indonesia's additive manufacturing industry. The target population comprised employees working in additive manufacturing companies located in Batam, Indonesia. The minimum sample size was determined using the inverse square root method [20], resulting in a minimum requirement of 155 respondents. A total of 163 valid questionnaires were collected and included in the analysis, satisfying the minimum sample requirement [21]. Primary data were collected through a structured online questionnaire distributed using Google Forms. Respondents were asked to evaluate their preferences toward leadership characteristics rather than assessing their current supervisors. All measurement items were assessed using a four-point Likert scale ranging from 1 (Strongly Disagree) to 4 (Strongly Agree), thereby eliminating the neutral response option and encouraging respondents to express a clear opinion.

The questionnaire items were adapted from previously validated measurement scales to ensure content validity and comparability with prior studies. Several indicators were slightly modified based on preliminary observations to better reflect the operational characteristics of Indonesia's additive manufacturing industry while

maintaining their original conceptual meanings. Several indicators were refined based on field observations and discussions with practitioners to better represent leadership behaviors and working conditions in Indonesia's additive manufacturing industry. Table 1 summarizes the measurement sources for each construct used in this study.

Table 1. Sources of Measurement Instruments

Construct	Number of Indicators	Source
Transformational Leadership	10	Romi et al., (2022) [22]
Transactional Leadership	4	Romi et al., (2022) [22]; Al-Rjoub et al., (2024) [15]
Democratic Leadership	5	Romi et al., (2022) [22]; Haryanto et al., (2022) [23]
Autocratic Leadership	6	Quintana & Gutiérrez-Falcón (2025) [24]
Job Satisfaction	15	Hossain & Islam (2025) [25]; Matzler & Renzl (2006) [2]; Nguyen & Ha (2023) [26]
Employee Loyalty	7	Hossain & Islam (2025) [25]; Matzler & Renzl (2006) [2]; Nguyen & Ha (2023) [26]

The research model consisted of four exogenous variables, namely transformational leadership, transactional leadership, democratic leadership, and autocratic leadership. Job satisfaction was specified as the mediating variable, while employee loyalty was treated as the endogenous variable. The conceptual framework is presented in Figure 1.

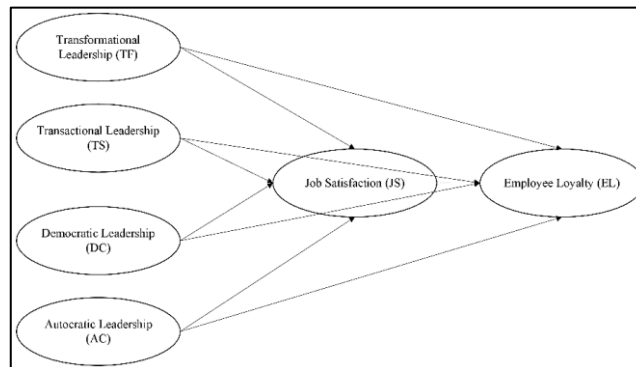


Figure 1. Research Framework

Data analysis was performed using Partial Least Squares Structural Equation Modeling (PLS-SEM) [27] with SmartPLS version 3.2.9. PLS-SEM was selected because it is suitable for simultaneously analyzing multiple latent constructs and mediation effects in predictive research models [27]. The analysis consisted of two stages. The first stage evaluated the measurement model through indicator reliability (outer loading), internal consistency reliability (composite reliability) [21], convergent validity (average variance extracted) [28], and discriminant validity using the heterotrait-monotrait ratio (HTMT) [29]. The second stage evaluated the structural model through bootstrapping, coefficient of determination (R^2), effect size (f^2), predictive relevance (Q^2), path coefficient significance, and mediation analysis.

Result and Discussion

Respondent Characteristics

A total of 163 valid responses were analyzed in this study. The respondents represented diverse demographic characteristics, including gender, age, educational level, and years of service. These characteristics provide an overview of the study sample and establish the demographic context for interpreting the relationships among leadership styles, job satisfaction, and employee loyalty. The respondent demographic characteristics are presented in Table 2.

Table 2. Respondent Characteristics

Characteristics	Category	Frequency	Percentages (%)
Gender	Male	144	88,3
	Female	19	11,7
Age	18-29 years	43	26,4
	30-45 years	88	54,0
	46-61 years	32	19,6
Education	High School	120	73,6
	Diploma	11	6,7
	Bachelor	29	17,8
	Postgraduate	3	1,8
Years of Service	<1 years	6	3,7
	1-3 years	32	19,8

Characteristics	Category	Frequency	Percentages (%)
	3-6 years	19	11,7
	>6 years	105	64,8

As shown in Table 1, the respondents were predominantly male (88.3%), aged between 30 and 45 years (54.0%), held a high school education (73.6%), and had more than six years of service (64.8%). These characteristics reflect the workforce profile commonly found in Indonesia's additive manufacturing industry, where production activities rely heavily on experienced shop-floor employees operating in structured and safety-oriented environments. Most respondents had worked for more than six years, suggesting that they had accumulated sufficient organizational experience to evaluate leadership practices, job satisfaction, and loyalty based on long-term interactions rather than temporary perceptions. Likewise, the predominance of high-school graduates indicates that operational employees constitute the largest proportion of the workforce, making leadership behaviors related to work direction, supervision, performance feedback, and recognition particularly relevant in their daily activities. Therefore, the respondent profile provides an appropriate context for examining how different leadership styles influence job satisfaction and subsequently shape employee loyalty within the additive manufacturing industry.

Measurement Model Evaluation

The measurement model evaluation indicates that all retained indicators satisfy the recommended reliability and validity criteria. All outer loading values exceed 0.60, Composite Reliability values are between 0.60 until 0.95, Average Variance Extracted (AVE) values exceed 0.50, and all HTMT values are below the recommended threshold of 0.90 [21]. Therefore, all constructs are considered reliable and valid for structural model evaluation. The detailed results are presented in Table 3.

Table 3. Final Result of Measurement Model Evaluation

Variable	Indicator	Loading Factor	AVE	Composite Reliability
Transformational Leadership Style	TF1	0,701	0.584	0.918
	TF2	0,722		
	TF3	0,802		
	TF4	0,817		
	TF5	0,834		
	TF6	0,814		
	TF7	N/A		
	TF8	0,748		
	TF9	0,658		
	TF10	N/A		
Transactional Leadership Style	TS1	N/A	0.650	0.848
	TS2	0,826		
	TS3	0,792		
	TS4	0,800		
Democratic Leadership Style	DK1	N/A	0.703	0.904
	DK2	0,793		
	DK3	0,862		
	DK4	0,882		
	DK5	0,815		
Autocratic Leadership Style	AK1	0,696	0.569	0.887
	AK2	0,649		
	AK3	0,716		
	AK4	0,811		
	AK5	0,802		
	AK6	0,836		
Job Satisfaction	KK1	0,682	0.541	0.943
	KK2	0,698		
	KK3	0,745		
	KK4	0,777		
	KK5	0,736		
	KK6	0,789		
	KK7	0,757		
	KK8	0,762		
	KK9	0,729		
	KK10	0,719		
	KK11	0,684		
	KK12	0,676		
	KK13	N/A		
	KK14	0,744		
	KK15	0,781		
Employee Loyalty	LK1	0,879	0.643	0.926
	LK2	0,869		
	LK3	0,859		

Variable	Indicator	Loading Factor	AVE	Composite Reliability
	LK4	0,753		
	LK5	0,755		
	LK6	0,738		
	LK7	0,745		

In addition, all Heterotrait-Monotrait Ratio (HTMT) values are below the recommended threshold of 0.90, confirming adequate discriminant validity as shown in Table 4. Therefore, the measurement model is considered reliable and valid for structural model evaluation.

Table 4. Final Result of HTMT

Variable	Autocratic	Democratic	Transactional	Transformational	Job Satisfaction
Autocratic					
Democratic	0,211				
Transactional	0,300	0,859			
Transformational	0,313	0,818	0,878		
Job Satisfaction	0,385	0,690	0,870	0,805	
Employee Loyalty	0,352	0,480	0,668	0,636	0,868

Structural Model Evaluation

The structural model was evaluated using the adjusted coefficient of determination (Adjusted R²) and predictive relevance (Q²) [27]. As presented in Table 5, the proposed model demonstrates satisfactory explanatory power, with adjusted R² values ranging from 0.044 to 0.651. The highest explanatory power was observed for job satisfaction (Adjusted R² = 0.651), followed by employee loyalty (Adjusted R² = 0.648) and transformational leadership (Adjusted R² = 0.640). In addition, all endogenous constructs produced positive Q² values, indicating that the structural model has adequate predictive relevance. Therefore, the structural model is considered appropriate for hypothesis testing.

Table 5. Test Result of Adjusted R² and Q²

Construct	Adjusted R ²	Q ²
Democratic Leadership	0.044	0.029
Transactional Leadership	0.477	0.298
Transformational Leadership	0.640	0.355
Job Satisfaction	0.651	0.347
Employee Loyalty	0.648	0.404

Hypothesis Testing

Hypothesis testing was conducted using the bootstrapping procedure. Table 6 presents the path coefficients (β), p-values, effect sizes (f^2), and hypothesis testing results for both direct and indirect relationships.

Table 6. Test Result of Adjusted R² and Q²

Hypothesis	Relationship	β	p-value	f^2	Result
H1	TF $\rightarrow$ KK	0.378	0.000	0.148	Supported
H2	TS $\rightarrow$ KK	0.382	0.000	0.179	Supported
H3	DK $\rightarrow$ KK	0.047	0.556	0.003	Not Supported
H4	AK $\rightarrow$ KK	0.173	0.000	0.079	Supported
H5	KK $\rightarrow$ LK	0.850	0.000	0.721	Supported
H6	TF $\rightarrow$ LK	0.047	0.658	0.002	Not Supported
H7	TS $\rightarrow$ LK	-0.013	0.886	0.000	Not Supported
H8	DK $\rightarrow$ LK	-0.142	0.095	0.024	Not Supported
H9	AK $\rightarrow$ LK	0.042	0.432	0.004	Not Supported
H10	TF $\rightarrow$ KK $\rightarrow$ LK	0.321	0.000	Indirect effect	Supported
H11	TS $\rightarrow$ KK $\rightarrow$ LK	0.324	0.000	Indirect effect	Supported
H12	DK $\rightarrow$ KK $\rightarrow$ LK	0.040	0.555	Indirect effect	Not Supported
H13	AK $\rightarrow$ KK $\rightarrow$ LK	0.147	0.001	Indirect effect	Supported

The direct effect analysis shows that transformational, transactional, and autocratic leadership have significant positive effects on job satisfaction, whereas democratic leadership does not. Job satisfaction also has a strong positive effect on employee loyalty ($\beta = 0.850$, $p < 0.001$) and exhibits the largest effect size in the structural model ($f^2 = 0.721$). In contrast, none of the four leadership styles has a significant direct effect on employee loyalty. The mediation analysis further reveals that job satisfaction significantly mediates the relationships between transformational leadership ($\beta = 0.321$, $p < 0.001$), transactional leadership ($\beta = 0.324$, $p < 0.001$), and autocratic leadership ($\beta = 0.147$, $p = 0.001$) and employee loyalty, whereas the indirect effect of democratic leadership is not significant ($\beta = 0.040$, $p = 0.555$).

These findings suggest that job satisfaction serves as the primary mechanism through which leadership styles influence employee loyalty. Rather than fostering employee loyalty directly, leadership styles first shape employees' perceptions of their work, which subsequently strengthen their commitment to the organization. This pattern is reflected in the significant effects of transformational, transactional, and autocratic leadership on job satisfaction, whereas their direct effects on employee loyalty remain insignificant. Previous studies have also demonstrated the mediating role of job satisfaction in the relationship between leadership and employee loyalty. Job satisfaction has been found to mediate the relationship between transformational leadership and employee loyalty [30], [31]. Similarly, transactional leadership indirectly enhances employee loyalty by improving employees' job satisfaction [32], [33]. In contrast, the present study did not find a significant mediating effect of job satisfaction on the relationship between democratic leadership and employee loyalty, which differs from the findings reported in [34].

An interesting finding of this study is that autocratic leadership positively influences job satisfaction despite having no direct effect on employee loyalty, in contrast with [35], [36]. This result suggests that autocratic leadership depends on the organizational context rather than the leadership style itself. In Indonesia additive manufacturing industry, production activities are characterized by strict operating procedures, quality standards, production targets, and occupational safety requirements. Under these conditions, employees may perceive directive leadership, close supervision, and prompt decision making as necessary to maintain operational efficiency rather than as controlling behaviors. This interpretation is consistent with Pizzolitto et al. (2023), who argued that the effectiveness of leadership styles varies according to organizational and work contexts rather than being universally positive or negative [6].

The significant mediating role of job satisfaction indicates that employees' overall work experience is the key mechanism through which leadership styles are translated into employee loyalty. Rather than influencing loyalty directly, leadership behaviors become effective only when they enhance employees' job satisfaction. This finding suggests that employees evaluate their long-term commitment to the organization based on how leadership improves their daily work experience instead of leadership behaviors alone. Similar evidence was reported by Chen et al. (2022), who found that transformational leadership improves employee outcomes through a positive employee relations climate that subsequently enhances job satisfaction [4]. Likewise, previous studies have identified job satisfaction as an important mechanism linking organizational factors with employee loyalty [30], [31]. From a managerial perspective, these findings imply that organizations should prioritize leadership practices that consistently improve employees' job satisfaction rather than emphasizing a particular leadership style. Leadership development initiatives should therefore strengthen supervisors' capabilities in providing constructive feedback, fair performance evaluation, employee recognition, and supportive working conditions, as these practices are more likely to strengthen employee loyalty through improved job satisfaction.

The mediating role identified in this study also provides practical implications for leadership development in manufacturing organizations. Rather than selecting a particular leadership style based solely on managerial preference, organizations should identify and develop leadership behaviors that consistently improve employees' job satisfaction, as job satisfaction has been shown to be the primary mechanism through which leadership contributes to employee loyalty. Considering that transactional leadership demonstrated the strongest positive effect on job satisfaction in this study ($\beta = 0.382$), leadership development programs should emphasize competencies such as setting clear performance expectations, providing timely performance feedback, recognizing employee achievements, and implementing fair reward systems. By emphasizing leadership behaviors that enhance employees' job satisfaction rather than merely adopting a particular leadership style, manufacturing organizations can establish a more sustainable strategy for strengthening long-term employee loyalty.

Conclusion

This study examined the mediating role of job satisfaction in the relationship between leadership styles and employee loyalty in Indonesia's additive manufacturing industry. The findings reveal that transformational, transactional, and autocratic leadership significantly enhance job satisfaction, whereas democratic leadership does not. Job satisfaction has a strong positive effect on employee loyalty and fully mediates the relationships between transformational, transactional, and autocratic leadership and employee loyalty. Conversely, none of the four leadership styles directly influences employee loyalty. These findings demonstrate that leadership contributes to employee loyalty primarily by improving employees' job satisfaction rather than through direct leadership behaviors.

The findings provide both theoretical and practical implications. Theoretically, this study extends the leadership literature by demonstrating that job satisfaction functions as a key mediating mechanism linking leadership styles and employee loyalty, particularly when multiple leadership styles are examined

simultaneously within a single structural model. Practically, rather than emphasizing a single leadership style, organizations should prioritize leadership behaviors that consistently improve employees' job satisfaction. Nevertheless, transactional leadership demonstrated the strongest positive effect on job satisfaction in this study, suggesting that clear performance expectations, timely feedback, and fair reward systems are effective managerial practices for strengthening employee loyalty through enhanced job satisfaction.

This study has several limitations that should be considered when interpreting the findings. First, the cross-sectional research design captures employees' perceptions at a single point in time, limiting the ability to establish causal relationships between leadership styles, job satisfaction, and employee loyalty. Second, the study focused exclusively on employees working in additive manufacturing companies located in Batam, Indonesia. Consequently, the findings may not fully represent employees working in other manufacturing sectors or different organizational settings with distinct leadership practices and workforce characteristics. Future studies may also compare the mediating role of job satisfaction with other organizational mechanisms, such as organizational commitment, organizational trust, or employee engagement, to identify which factors most effectively translate leadership practices into employee loyalty.

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