

# “Effect of transformational and transactional leadership on SMEs in Indonesia”

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# EFFECT OF TRANSFORMATIONAL AND TRANSACTIONAL LEADERSHIP ON SMEs IN INDONESIA

## Abstract

Leadership has an important role in achieving the SMEs' innovation and performance. One of the great concepts of leadership styles is the Burns' (1978) concept, which divides leadership into two: transformational and transactional. This study analyzed the direct and indirect effect of transformational and transactional leadership on SMEs' performance. This was conducted in seven regencies/cities in East Java Province, with 165 SMEs on superior indigenous food and beverage. The main research data were obtained by distributing the questionnaires. It uses path analysis to determine the direct and indirect effect using the LISREL software. The results showed that transformational leadership has a positive and significant effect on SMEs' innovation and performance directly and indirectly. Transactional leadership has a direct positive and insignificant effect on SMEs' innovation and performance. However, transactional leadership was found to have an indirect positive and significant effect on SMEs' performance. In conclusion, transformational leadership is more important for improving SMEs' performance in Indonesia than transactional. These results provide a practical contribution for SMEs' leaders to improve transformational leadership, which is oriented towards charisma, intellectual stimulation, and individual consideration.

**Keywords** leadership, innovation, performance, entrepreneurship, Indonesia

**JEL Classification** L26, L66

## INTRODUCTION

Small and medium enterprises (SMEs) are among the leading forces that drive economic development in Indonesia. According to the data obtained from the Ministry of Cooperatives and SMEs, the contribution of SMEs in 2017 is as follows: 1) 99.99% business units, 2) 97.02% of labor, 3) 60% of Gross Domestic Product (GDP), 4) 14.17% of non-oil exports, and 5) 58.18% of investments. These show that SMEs have great potential in mobilizing economic activities. Conversely, SMEs are constantly faced with competitive pressure due to globalization; therefore, there is a need for improved innovation and performance (Khaliq, C. Rehman, Roomi, S. Rehman, & Irem, 2014).

The highly competitive and rapidly changing environment enhance the importance of leadership in achieving a competitive advantage over their competitors to improve organizational performance. Effective leadership plays an important role to determine the success or failure of organization (Tourish, 2014). Effective leadership can help to improve the organizational performance in situations where the organization faces a lot of new problems and challenges. Several studies show that SMEs faces problems related to leadership styles that reduce organizational performance because they do not identify effective or ineffective leaders (Nazarian, Soares, & Lottermoser, 2017).

Besides, the widely developed leadership paradigm has attracted numerous practitioners and academics. Burns (1978) reported that leadership is distinguished into two types: transformational and transactional. Subsequently, several studies concerning their direct effects on SMEs' innovation and performance have been conducted. The results from previous studies show that numerous research gaps can be raised as a problem.

Transactional leaders generate sufficient confidence in followers and support them in completing their tasks. They acknowledge follower's needs and desires but also explain how those needs will be fulfilled if follower performs the expected performance. However, transactional leadership can be satisfying and effective in a limited way. Instead, transformational leadership substantially adds to the impact of transactional leadership (Bass, 1985). Due to the ineffectiveness of contingent negative reinforcement and several other reasons, transactional leadership is regarded as producing in expected performance with little possibility to achieve significant improvement in effort and results. Transformational leadership, in contrast, results in broader change according to effort, performance, and development.

Despite the wider quantity of research on leadership, only a few studies have analyzed the indirect effect of both transformational and transactional leadership on SMEs performance with innovation as a mediator (Md Saad & Mazzarol, 2010; Ur Rehman, Bhatti, & Chaudhry, 2019). Theory Resource-Based View (RBV) states that a company's strategic assets, such as an innovative organizational culture, affect its performance (Barney, 1991). An innovative organizational culture is considered as one of the strategic assets that will help a company improve its performance.

SMEs need to utilize its potential properly while depicting good leadership to improve its innovation and performance. The selected SMEs were those situated in Probolinggo City, Probolinggo, Lumajang, Jember, Bondowoso, Situbondo, and Banyuwangi Regencies because they have exclusive indigenous food and beverage businesses. Therefore, the problem in this research is "What kind of leadership is more important for improving SMEs' performance with innovation as a mediating variable?"

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## 1. LITERATURE REVIEW

Transformational leadership drives innovation in two ways. Firstly, it can boost the motivation of the employees (intrinsic) by stimulating creativity, which is the primary key to innovation (Shin & Zhou, 2003). Secondly, it offers intellectual stimulation, thereby encouraging employees to think "outside the box" (Elkins & Keller, 2003). Previous studies discovered the influence of transformational leadership on SMEs' innovation. In Turkey and Malaysia, it has a significant influence on SMEs' innovation (Iscan, Ersari, & Naktiyok, 2014; Aslan, Diken, & Sendogdu, 2011; Md Saad & Mazzarol, 2010; Ur Rehman, et al., 2019). Transformational leaders also play a huge role in advancing SMEs' innovation in East African countries, such as Kenya (Sang, 2017) and Rwanda (Gashema & Gao, 2018). However, Feranita, Gumanti, Wahyudi, and Puspitaningtyas (2017a) reported no significant effect on SMEs' innovation.

According to Bass and Riggio (2006), these leaders motivate their employees to demonstrate an exceptional performance level, which exceeds expectations. This boosts employee satisfaction and commitment to the company. Several empirical studies show that transformational leadership improves SMEs' performance (Sheshi & Kercini, 2017; Boukamcha, 2019). In Turkey, the influence is stronger than other leadership styles (Iscan et al., 2014; Ozer & Tinaztepe, 2014).

In West African countries, transformational leadership improves SMEs' financial performance in Nigeria (Israel, 2016) and marketing performance in Ghana (Afriyie, Du, & Ibn Musah, 2019). Meanwhile, in some Asian countries such as India and Pakistan, there is a significant relationship between transformational leadership and SMEs' performance (Singh, 2016; Manzoor, Wei, Nurunnabi, Subhan, Shah, & Fallatah, 2019). Subsequently, transformational leadership significantly influences SMEs' performance in

Asian countries, such as Malaysia (Arham, 2014; Ur Rehman et al., 2019) and Indonesia (Arsawan, Pasek, & Suryantini, 2017; Sulistiyani, Udin, & Rahardja, 2018). These contradict the results from the study conducted by Feranita, Gumanti, Wahyudi, and Puspitaningtyas (2017b), which stated that transformational leadership has no significant effect on SMEs.

Dougherty and Hardy (1996) stated that this leadership style facilitates unconventional and innovative ways of reasoning. Besides, it leads to work processes based on new knowledge and technology, which are fundamental to company performance. In Malaysia, transformational leaders' emphasis on product innovation exhibits stronger performance (Md Saad & Mazzarol, 2010). Innovative culture serves as a mediator between transformational leadership style and SMEs performance (Ur Rehman et al., 2019).

According to previous studies conducted in Malaysia, transactional leadership has a significant influence on company innovation. Transactional leaders can emphasize SMEs' innovation, especially in process innovation (Md Saad & Mazzarol, 2010). Transactional leaders can develop an innovative SMEs culture (Ur Rehman et al., 2019). This type of leadership has a significant and positive effect on Kenya's SMEs' innovation (Sang, 2017). However, Aslan et al. (2011) and Iscan et al. (2014) showed that it does not significantly affect SMEs' innovation.

Transactional leadership is considered an important indicator to measure company performance. It focuses on maintaining the status quo to increase company revenue (Bass, 1985). In some Asian countries such as India and Malaysia, it significantly influences SMEs' performance (Singh, 2016; Ur Rehman et al., 2019). According to a study conducted by Arsawan et al. (2017), Indonesia's leadership style is recommended for sustainable SMEs growth. Transactional leadership was also discovered to have a positive and significant relationship with SMEs' performance in African countries, such as Tanzania (Mgeni & Nayak, 2016), Nigeria (Israel, 2016), and Kenya (Asiimwe, Linge, & Sikalieh, 2016). Iscan et al. (2014) and Ozer and Tinaztepe (2014) stated that there is no significant effect on SMEs' performance.

It improves performance through innovation's mediating role, which is one of the company's strategic

assets (Barney, 1991). Ur Rehman et al. (2019) reported that SMEs that implemented innovative culture in Malaysia could significantly mediate between transactional leadership style and SMEs' performance.

SMEs with strong innovative capabilities are at an advantage over their competitors because it tends to boost performance (Li & Mitchell, 2009; Rosenbusch, Brinckmann, & Bausch, 2011). Previous studies stated that one of the factors influencing SMEs' performance is innovation (J. Donkor, G. Donkor, Kwarteng, & Aidoo, 2018; Afriyie et al., 2019). Subsequently, a high level of innovative capacity tends to improve performance on a large scale. It also has a significant influence on SMEs' performance in Asian countries, namely Pakistan (Yasin, Nawab, Bhatti, & Nazir, 2014), China (Lu, Dai, & Zhang, 2018), and Malaysia (Ur Rehman et al., 2019). In Vietnam, there is a positive causality relationship that changes from sales growth to SMEs' innovation (D. Nguyen, H. Nguyen, & K. S. Nguyen, 2018), likewise, in America, such as Brazil (Vasconcelos & Oliveria, 2018) and Colombia (Restrepo-Morales, Loaiza, & Vanegas, 2019).

## 2. AIMS AND HYPOTHESES

This research aims to analyze the one having the greatest contribution to improving SMEs' performance and innovation among the transformational and transactional leadership.

Therefore, the hypotheses in this study are:

*H1: Transformational leadership influences SMEs' innovation.*

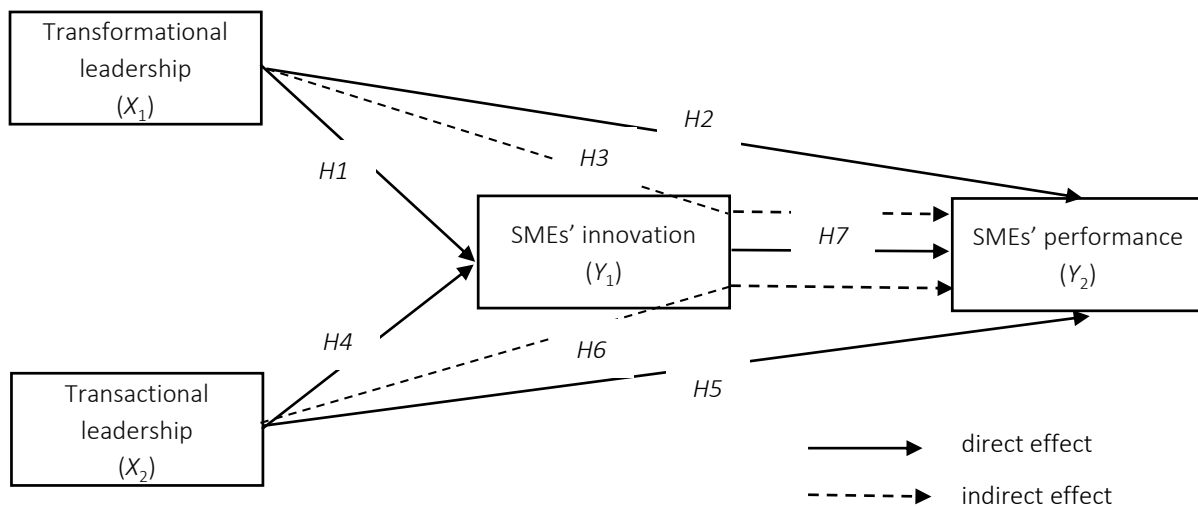
*H2: Transformational leadership influences SMEs' performance.*

*H3: Innovation mediates the effect of transformational leadership on SMEs' performance.*

*H4: Transactional leadership influences SMEs' innovation.*

*H5: Transactional leadership influences SMEs' performance.*

*H6: Innovation mediates the effect of transactional leadership on SMEs' performance.*



**Figure 1.** Research conceptual structure

*H7: Innovation influences SMEs' performance.*

Figure 1 shows the research framework and hypotheses based on theoretical and empirical studies.

### 3. METHODS

This research involves all the entire 280 foods and beverage SMEs in Probolinggo City, Probolinggo, Lumajang, Jember, Bondowoso, Situbondo, and Banyuwangi Regencies. This sector was chosen because it is one of the government's main focuses in implementing the "Making of Indonesia 4.0" program. The seven regencies or cities were selected because they excelled more in this sector than in the eastern development corridors.

This research applied a proportionate sampling method to determine the relative size of each regency/city. The number of samples was detected using the Slovin formula with an error rate of 5%, and 165 SMEs were obtained. The unit of analysis is the leader, entrepreneur, owner, or manager of the SMEs. Data collection was obtained from questionnaires shared to the respondents from April to June 2019, with a 5-point Likert scale adapted from the appropriate literature.

According to Burns (1978), transformational leadership provides stimulation and inspiration for employees to achieve extraordinary results. On the contrary,

transactional leadership offers financial rewards following the productivity generated by employees. The measurement of these variables was adapted from a study conducted by Aslan et al. (2011). Therefore, this research focuses on three dimensions of transformational leadership: charisma, intellectual stimulation, and individual consideration. It also focuses on two dimensions of transactional leadership, such as contingent reward and exception-passive management.

Innovation is the company's ability to adopt new ideas, products, and processes successfully. The measurement of these variables is adapted from a questionnaire developed by Ciang Wu (2017), which consists of three dimensions: product, process, and organizational innovation. Performance is defined as the company's achievement, and the variables were measured from the research conducted by Murat, Ar. and Baki (2011) and McDermott and Prajogo (2012). Its dimensions are measured based on the market shares, sales, and profits of the competitors.

This study used path analysis to determine the direct and indirect effect of transformational and transactional leadership on SMEs' performance, with innovation serving as its mediator, using the LISREL software for hypothesis testing.

### 4. RESULTS

Based on the instrument validity test results on the variables such as transformational and

**Table 1.** The result of the validity and reliability test

Variable and dimension	Cronbach Alpha	Correlation
Transformational leadership	0.891	
<b>Charisma</b>		
A leader respected by the employee		0.715
Employees are proud of their leader		0.506
The leader considers the results ethically		0.674
<b>Intellectual stimulation</b>		
Leaders have a diverse point of view.		0.712
The leader advises the employee.		0.751
Leaders state their expectations.		0.728
<b>Individual considerations</b>		
Leaders teach and train employees		0.728
Leaders' aid the employees		0.779
Leaders offer feedback		0.851
Transactional leadership	0.791	
<b>Contingent reward</b>		
Employees support the leader		0.495
The leader offers an appreciation		0.644
The leader appreciates good work		0.785
<b>Exception-passive management</b>		
A leader executes an action after a bad situation		0.624
Unprepared leader unless under coercion		0.718
The leader intervenes when an issue becomes serious		0.375
Innovation	0.846	
<b>Product innovation</b>		
The company introduced or triggered new product innovation		0.911
<b>Process innovation</b>		
The company introduced or triggered new process innovation		0.877
<b>Organizational innovation</b>		
The company introduced or triggered new organizational innovation		0.837
Performance	0.908	
<b>Market share</b>		
Compared to competitors, the company has better market share		0.911
<b>Sales</b>		
Compared to competitors, the company has better sales		0.950
<b>Profit</b>		
Compared to competitors, the company has better profit		0.895

transactional leadership, innovation, and performance, a correlation value of  $p\text{-value} < \alpha(0.05)$  was obtained; therefore, all items are declared valid. Following the instrument reliability test results, the Cronbach Alpha coefficient of  $> 0.60$  was determined; therefore, the variables were declared reliable. The results from the validity and reliability tests are shown in Table 1.

According to Table 2, several conclusions were drawn from the respondents' general description based on gender, age, marital status, educational background, and duration of business. First, most respondents were women (81.8%). Second,

most were between the ages of 41-50 years (54.5%). Third, almost all the respondents were married (96.4%). Fourth, they are mostly dominated by senior high school (39.4%) and junior high school (32.1%) graduates. Fifth, the duration of the business is 6-10 years (44.8%).

According to the normality test results, the entire variables were normally distributed, shown by the  $p\text{-value}$  of skewness and kurtosis, which is determined as  $> 0.05$ . Likewise, multivariate normality shows the  $p\text{-value}$  of skewness and kurtosis to be  $0.750 > 0.05$ . This indicates that the data are normally distributed.

**Table 2.** Respondents’ general description

No.	Characteristic	Description	Distribution	
			Frequency	Percentage (%)
1	Gender	Male	30	18.2
		Female	135	81.8
		Total	165	100.0
2	Age (years)	21-30	6	3.6
		31-40	35	21.2
		41-50	90	54.6
		> 50	34	20.6
		Total	165	100.0
3	Marital status	Married	159	96.4
		Unmarried	1	0.6
		Widow/widower	5	3.0
		Total	165	100.0
4	Latest education	Junior high school	53	32.1
		Senior high school	65	39.4
		Diploma	2	1.2
		Bachelor (S1)	8	4.9
		Other	37	22.4
	Total	165	100.0	
5	Leading experience (years)	≤ 3	15	9.1
		4-5	42	25.5
		6-10	74	44.8
		11-15	12	7.3
		> 15	22	13.3
	Total	165	100.0	

The results from the direct influence test are shown in Table 3. The entire model consists of 5 direct paths; 3 of them have a significant effect, while the remaining 2 have a non-significant effect. Therefore, hypotheses 1, 2, and 7 are accepted, while 4 and 5 were rejected.

The results from testing the indirect effect are shown in Table 4. Generally, the two indirect path

models have a significant effect; therefore, hypotheses 3 and 6 are accepted.

Table 5 shows the test results from the direct, indirect, and total effect. Each independent variable’s total effect is stated as follows: 29% of transformational and 11% of transactional leadership.

Figure 2 shows concise results from path analysis.

**Table 3.** Hypothesis testing results from the direct effect

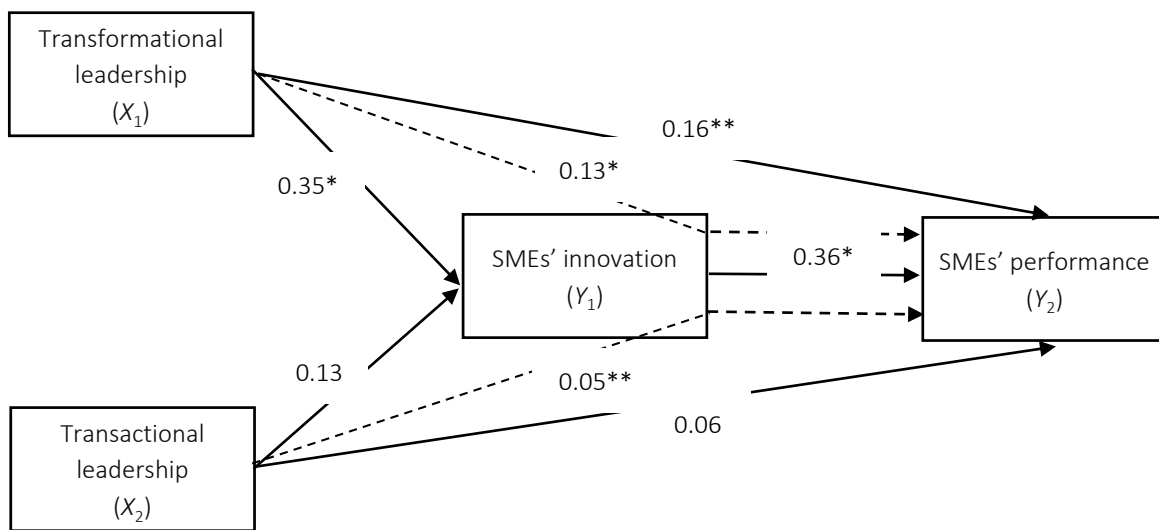
Hypotheses	Regression model	Estimation value	t-value
H1	Transformational leadership ( $X_1$ ) → SMEs’ innovation ( $Y_1$ )	0.35	3.77*
H2	Transformational leadership ( $X_1$ ) → SMEs’ performance ( $Y_2$ )	0.16	1.72**
H4	Transactional leadership ( $X_2$ ) → SMEs’ innovation ( $Y_1$ )	0.13	1.43
H5	Transactional leadership ( $X_2$ ) → SMEs’ performance ( $Y_2$ )	0.06	0.66
H7	SMEs innovation ( $Y_1$ ) → SMEs’ performance ( $Y_2$ )	0.36	4.75*

Note: \* and \*\* show significance at 5% and 10% levels, respectively.

**Table 4.** Hypothesis testing results from indirect effects

Hypotheses	Regression model	Estimation value	t-value
H3	Transformational leadership ( $X_1$ ) → SMEs’ innovation ( $Y_1$ ) → SMEs’ performance ( $Y_2$ )	0.13	4.00*
H6	Transactional leadership ( $X_2$ ) → SMEs’ innovation ( $Y_1$ ) → SMEs’ performance ( $Y_2$ )	0.05	1.95**

Note: \* and \*\* show significance at 5% and 10% levels, respectively.



Note: \* and \*\* show significance at 5% and 10% levels, respectively.

Figure 2. The path coefficient of direct and indirect effects

Table 5. Test results from the direct effect, indirect effect, and total effect

Regression model	Direct effect	Indirect effect	Total effect
Transformational leadership ( $X_1$ ) → SMEs' performance ( $Y_2$ )	0.16	0.13	0.29
Transactional leadership ( $X_2$ ) → SMEs' performance ( $Y_2$ )	0.06	0.05	0.11

## 5. DISCUSSION

According to Table 3, the data analysis results show the  $t$ -value of 3.77, which is above the critical ratio (1.96); therefore,  $H1$  is accepted at the level of  $\alpha = 5\%$ . It was discovered that transformational leadership has a positive and significant effect on SMEs' innovation. This means that transformational leadership boosts SMEs' innovation. Following the respondents' responses, its variables show 2 indicators in the very good category, while the remaining 7 are in a good category. This research shows that qualities of SMEs' leaders such as charisma, intellectual stimulation, and individual consideration trigger innovation. This finding supports previous studies (Md Saad & Mazzarol, 2010; Aslan et al., 2011; Iscan et al., 2014; Sang, 2017; Gashema & Gao, 2018; Ur Rehman et al., 2019). Also, the evidence is provided, which shows that SMEs' innovation is achieved through transformational leadership.

The data analysis in Table 3 shows that the  $t$ -value is 1.72, which is above the critical ratio

(1.645); therefore,  $H2$  is accepted at the level of  $\alpha = 10\%$ . Therefore, transformational leadership has a positive and significant effect on SMEs' performance. This means that this type of leadership boosts SMEs' performance. Furthermore, most SMEs' leaders who filled out the research questionnaire were women (81.8%). Lopez-Zafra, Garcia-Retamero, and Martos (2012) reported that transformational leadership is determined by femininity; in other words, women tend to be more transformative. Subsequently, this is the desired leadership style because it positively influences various performance outcomes (Chen et al., 2018). This finding strengthens the results from previous studies (Iscan et al., 2014; Ozer & Tinaztepe, 2014; Arham, 2014; Israel, 2016; Singh, 2016; Sheshi & Kercini, 2017; Arsawan et al., 2017; Sulistiyani et al., 2018; Boukamcha, 2019; Afriyie et al., 2019; Manzoor et al., 2019; Ur Rehman et al., 2019). Conversely, this study is consistent with the study conducted by Bass and Riggio (2006), which stated that transformational leaders could incite their employees to achieve better performance.



Table 4 shows that the results from data analysis show that the  $t$ -value is 4.00, which is above the critical ratio (1.96); therefore,  $H3$  is accepted at the level of  $\alpha$  5%. Transformational leadership has a positive and significant effect on SMEs' performance in accordance with an innovative medium. This supports the findings from 2 previous studies (Md Saad & Mazzarol, 2010; Ur Rehman et al., 2019). From the data shown in Table 5, the total effect of transformational leadership on SMEs' performance offers a greater value than the total and direct effects of 0.29 and 0.16, respectively. Therefore it provides a greater contribution than the effect. Contributions made by innovation serve as a mediator between transformational leadership and the performances of SMEs. This study also discovered that transformational leadership has a direct and indirect positive and significant effect on SMEs' innovation and performance. Therefore, it was concluded that innovation mediators trigger an influence on SMEs' performance.

In accordance with the data analysis in Table 3, the  $t$ -value is 1.43, which is below the critical ratios of 1.96 and 1.645; therefore,  $H4$  is rejected at  $\alpha = 5\%$  and  $10\%$ . Transactional leadership has a positive and insignificant effect on SMEs' innovation. This shows that this leadership style could not improve SMEs' innovation. This is in line with the studies carried out by Aslan et al. (2011) and Iscan et al. (2014). Previous research showed the effect of transactional leadership on SMEs' innovation by utilizing items in the manufacturing and service sectors (Sang, 2017; Ur Rehman et al., 2019). However, this study is based on SMEs in the manufacturing sector, particularly food and beverages. Although different outcomes are expected, assuming the research is conducted on SMEs in the manufacturing and service sectors.

In Table 3, the  $t$ -value is 0.66, and it is below the critical ratio, which is 1.96 and 1.645; therefore,  $H5$  is rejected at  $\alpha = 5\%$  and  $10\%$ . This shows that transactional leadership has a positive and insignificant effect on SMEs' performance. This means that the supporting indicators of this type of leadership have not effectively driven SMEs' performance. From an empirical perspective, this research's results contradict previous studies (Sang, 2017; Ur Rehman et al., 2019). Ur Rehman et al. (2019) stated that there are 4 indicators: contingent

reward, exception-active management, exception-passive management, and passive management. Consequently, only 2 of the indicators, contingent reward and exception-passive management, were used in this research. However, this study follows Iscan et al. (2014) and Ozer and Tinaztepe (2014).

Table 4 shows the data analysis results where the  $t$ -value is 1.95, which is above the critical ratio of 1.645; therefore,  $H6$  is accepted at  $\alpha = 10\%$ . Transactional leadership has a positive and significant effect on SMEs' performance based on innovative mediators. These findings support the results from previous research (Ur Rehman et al., 2019). Table 5 shows that transactional leadership's total effect on SMEs' performance offers a greater value than its direct influence (total and direct effects are 0.11 and 0.06, respectively). Therefore, its contribution is more important than direct effect and serves as a mediator between transactional leadership and SMEs' performance. The findings from this study show that it directly has a positive and insignificant effect on SMEs' performance. However, it has an indirect positive and significant effect on SMEs' performance (through innovation variables). Therefore, the influence of transactional leadership on SMEs' performance is triggered by innovation mediators.

Based on the data analysis results in Table 3, the  $t$ -value is 4.75, which is above the critical ratio of 1.96; therefore,  $H7$  is accepted at the level of  $\alpha = 5\%$ . Innovation has a positive and significant effect on SMEs' performance. This means that it boosts SMEs' performance. The respondents' responses show that the innovative variable has two indicators stated in the good enough category and 1 in the good category. Besides, all the performance variables are in a good category. These findings provide evidence that shows that indicators such as product, process, and organizational innovation have a significant influence on SMEs' performance measured by market shares, sales, and profits. Empirically, these data are following previous studies that examined its effect on SMEs' performance using different indicators of measurements (Donkor et al., 2018; Afriyie et al., 2019; Yasin, Nawab, Bhatti, & Nazir, 2014; Lu et al., 2018; Ur Rehman et al., 2019; Nguyen et al., 2018; Vasconcelos & Oliveria, 2018; Restrepo-Morales et al., 2019).

## CONCLUSION

For SMEs to succeed in improving their performance, SMEs must have good innovation. An appropriate leadership style supports SMEs that can innovate. According to Burns (1978), there are two types of leadership styles: transformational and transactional. The path analysis results revealed that transformational leadership has a positive and significant effect on SMEs' innovation and performance. However, transactional leadership directly has a positive and insignificant effect on SMEs' performance. Subsequently, it has an indirect positive and significant effect on SMEs' performance through innovative mediators. This means that innovation plays an important role in the relationship between transactional leadership and SMEs' performance. Additionally, transformational leadership has a greater total effect (29%) than transactional leadership (11%). Therefore this type of leadership plays an important role in improving SMEs' performance in Indonesia. The recommendations that can be given are that the government should facilitate training to improve leadership. The government can design training programs and mentoring for sustainable and effective SMEs. The program can be oriented towards enhancing charismatic and transformational leadership, stimulates intellectuality, and emphasizes individual considerations so that SMEs can increase innovation and performance. In conclusion, two limitations were determined in this study. First, the samples taken are only from the manufacturing sector, specifically the food and beverage industries. Second, the study was conducted in only seven regencies or cities located in East Java Province. Therefore, further research on the manufacturing and service sectors covering a wider area at the national level needs to be conducted to generalize the results.

## AUTHOR CONTRIBUTIONS

Conceptualization: Nungky Viana Feranita, Alifian Nugraha, Sampir Andrean Sukoco.

Data curation: Nungky Viana Feranita.

Formal analysis: Sampir Andrean Sukoco.

Funding acquisition: Nungky Viana Feranita.

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Resources: Sampir Andrean Sukoco.

Software: Alifian Nugraha.

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Validation: Nungky Viana Feranita, Alifian Nugraha, Sampir Andrean Sukoco.

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Writing – original draft: Sampir Andrean Sukoco.

Writing – review & editing: Sampir Andrean Sukoco.

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