THE IMPACT OF LEADERSHIP STYLES ON SAFETY CLIMATE IN MANUFACTURING FACILITIES

RATHNASOORIYA, J.C.T.[1], SRIDARRAN, P.[2] AND MADDAKANDAGE, M.N.U.[3*]

[1]*Department of Building Economics, University of Moratuwa, Sri Lanka*
[2,3]*Department of Facilities Management, University of Moratuwa, Sri Lanka*
* Correspondence E-mail: nadeeraum@uom.lk

Abstract. In high-risk manufacturing facilities, establishing a strong safety climate is essential for reducing workplace accidents and enhancing employee well-being. Leadership plays a critical role in shaping safety climate by influencing how safety policies are communicated, implemented, and perceived by employees. To address the gap of lack of research exploring the impact of various leadership styles on the safety climate within the Sri Lankan manufacturing industry, this study investigates the impact of six leadership styles; Transformational, Transactional, Servant, Autocratic, Laissez-Faire, and Situational on multiple dimensions of safety climate in Sri Lankan manufacturing facilities. A quantitative research approach was employed using the Multifactor Leadership Questionnaire (MLQ) and an adapted safety climate questionnaire. Data were collected from 210 employees across seven manufacturing facilities, representing managerial, supervisory, technical, and operational roles. Correlation and multiple linear regression analyses were conducted using SPSS to examine relationships between leadership styles and six safety climate dimensions: Safety Communication and Feedback, Supervisor's Role in Safety, Peer Influence and Safety Culture, Management Commitment to Safety, Safety Procedures and Compliance Pressure, and Training and Emergency Preparedness. The results indicate that Transformational, Transactional, and Servant leadership styles are positively associated with stronger safety climate, whereas Autocratic and Laissez-Faire styles exhibit significant negative relationships. Situational leadership demonstrated mixed effects depending on contextual application. The findings highlight the importance of supportive leadership approaches in strengthening safety climate and improving employee engagement in safety practices. This study contributes empirical evidence to the limited literature on leadership and safety in Sri Lankan manufacturing and provides practical implications for enhancing workplace safety performance.

Keywords. *Leadership; Leadership styles; Manufacturing Facilities; Safety Climate; Safety; Workplace Safety*

1. Introduction

The manufacturing sector has a large potential to contribute to the economy by employing a large number of people. Particularly, in developing countries like Sri Lanka, manufacturing is the backbone of the economy (de Mel, 2020; Gabriel et al., 2020). However, this sector suffers from inadequate safety management practices, which often result in accidents and deaths (Annual Injury Report - 2022, 2022). Thus, Occupational Health and Safety pertain to modern manufacturing facilities and are integrated within the organization's legal performance obligations (Clarke, 2016). OHS encompasses various activities that are part of the hazardous work processes, the use of sophisticated machines, complex processes, and the increasing rate of workplace accidents and injuries (Alli, 2008).

In the manufacturing industry, where the risks associated with the work are, by and large, on the higher side, having a strong safety climate goes a long way in alleviating risks (Baumgartner, 2009). The impact of positive safety climate includes lower rates of injuries, improved safety behaviours, as well as enhanced safety performance throughout

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the organization (Walker, 2010). Compliance with safety practices is critical in the manufacturing industry not only for obedient legal practice but for industry standards and client satisfaction as well. Maintaining a strong safety climate is equally important as it helps in eliminating workplace hazards and accidents while increasing productivity (Griffin & Curcuruto, 2016). Among the many elements that contribute to the shaping of the safety climate within the manufacturing facilities, leadership is one of the primary elements (Baumgartner, 2009). Poor leadership results in gaps and a lack of defined procedures and inconsistencies in the application of safety policies, leading to a poor safety climate (Yang et al., 2010).

The safety climate of an organization is highly dependent on the leadership styles adopted by the managerial staff (Du & Sun, 2012). An example is the transformational leadership style encourage proactive safety measures by instilling the importance of safety (Shen et al., 2017), while transactional style emphasizes adherence to standards and safety regulations (Guan, 2023). Unlike other high-risk sectors such as healthcare or construction, manufacturing is characterized by tightly coupled human–machine interactions, repetitive processes, and high exposure to mechanical hazards, where even minor lapses in safety climate can translate into accidents (Jiang et al., 2019). Furthermore, leadership significantly shapes safety climate and accident-related outcomes, as effective safety leadership is associated with lower risk perceptions linked to unsafe behaviours in manufacturing (Oah et al., 2018). Still, the ways various leadership approaches influence the safety climate in the manufacturing sector is yet to be thoroughly examined (Sonderstrup-Andersen et al., 2011). Moreover, overlapping leadership style constructs and a lack of consistency in the conceptualisation and assessment have limited a clear understanding of how different leadership styles influence the safety climate in the manufacturing sector (Ta et al., 2022). Though there is growing literature on leadership and safety in that organization (Wijesinghe, 2021), research exploring the impact of various leadership styles on the safety climate within the Sri Lankan manufacturing industry remains scant. The majority of safety climate research appears to focus on the Western developed industrial context (Mullen & Kelloway, 2009). Consequently, leadership policies suited to the Sri Lankan cultural and economic context are not well documented (Dias & Kailasapathy, 2023). To fill this gap, this study focuses on how different leadership styles impact the safety climate within the Sri Lankan manufacturing environment. The research aims to determine the impact of leadership styles on the safety climate in manufacturing facilities. This aims to answer the research question of "How do different leadership styles influence the safety climate in Sri Lankan manufacturing industries?"

2. Literature Review

In occupational health and safety, safety climate is a construct to capture employees' shared perceptions regarding the assigned organizational priority to safety, relative to other operational demands (Clarke, 2016; Flin et al., 2000; Wu et al., 2015; Zohar, 1980). It is widely studied because it is easier to measure and improve than the broader concept of safety culture, making it useful for research, practical interventions, and comparisons across different industries (Jiang et al., 2019). A poor safety climate may encourage employees to prioritize productivity over safe practices, increasing risk exposure

and discouraging the reporting of hazards (Clarke, 2010). In the study of workplace safety for risk-intensive areas such as manufacturing, safety climate is an important aspect. Safety climate serves as both an indicator and an outcome of organisational safety culture, arising from shared assumptions and beliefs about safety and work activities (Zakaria et al., 2020). A manufacturing environment marked by hazardous machinery, chemicals, and fast-paced work processes poses a great risk, which makes it imperative for organizations to sustain a positive safety climate (Fernández-Muñiz et al., 2007). Weak safety climates, the absence of leadership prioritizing safety, may foster complacency, unsafe actions, and increased accidents (Bensonch et al., 2022).

2.1. DIMENSIONS OF SAFETY CLIMATE

This study adopts six safety climate dimensions: management commitment, supervisory support, safety communication, peer influence, training, and procedural compliance—commonly identified in prior literature as key determinants of safety climate in high-risk industries, including manufacturing. A positive safety climate is the visible commitment from leadership, which signals to employees that safety is a core organizational value, rather than a secondary concern of productivity or cost-cutting (Okolie & Okoye, 2012). This management commitment manifests through the allocation of resources, consistent enforcement of safety policies, and leadership's active engagement in promoting safe work practices (Flin et al., 2000). Equally important dimensions are the perceptions of supervisory support and peer influence, which translate organizational priorities into everyday behaviours (Wu et al., 2015) Open and transparent safety communication forms the backbone of an effective safety climate, ensuring that employees are well informed about hazards, procedures, and incident learnings, thereby encouraging proactive hazard identification and reporting (Konjin et al., 2015). The role of effective leadership, safety training, communication, and employee engagement is a key factor in creating a robust safety climate (Kumar et al., 2025). The presence of clear policies and procedures, balanced with reasonable compliance expectations, ensures that employees understand the requirements of the safety climate (Silva et al., 2004). The multidimensional nature of safety climate helps explain how organizational practices, leadership, and employee attitudes together shape overall safety performance (Todaro et al., 2023). Thus, these six dimensions collectively explain how leadership, organizational systems, and employee interactions shape overall safety climate.

2.2. SAFETY CLIMATE AND LEADERSHIP

Leadership styles play a critical role in safety climate within manufacturing facilities by influencing employees' perceptions, attitudes, and behaviours of workplace safety (Ta et al., 2022). Leadership styles shape the collective perceptions and behaviours that constitute the safety climate, ultimately impacting organizational safety performance and incident reduction (Sankar et al., 2022)

2.2.1 Leadership Styles in Organizational Contexts

The study focuses on six widely recognized leadership styles—transformational, transactional, servant, autocratic, laissez-faire, and situational—selected based on their strong theoretical grounding and frequent application in organizational and safety

research as the most influential styles shaping employee behaviour and safety climate outcomes (Cai, 2023).

Transformational leadership is characterized by the capacity to foster employee motivation and inspiration through innovation, creating strong interpersonal relationships based on trust and respect (Eagly et al., 2003). The studies from the aviation and healthcare industries corroborate the effectiveness of transformational leadership in shaping safety climate (Alessa, 2021). In contrast, the transactional approach prioritize the completion of tasks, adherence to policies, and the operational functionality of the organization (Bono & Judge, 2004). Transactional leadership would impose strict compliance to set safety rules and impose punishments on those who do not follow them, thereby ensuring that safety measures are followed to avoid accidents caused by negligence or unsafe practices (Eğriboyun, 2019).

Servant leaders prioritize empathy, listening, stewardship, and community building, fostering an environment where employees feel valued and empowered (Hunter et al., 2013). In safety climate, employees are free to report safety concerns and make suggestions (Dartey-Baah et al., 2021). Autocratic or authoritarian leaders take it upon themselves to make decisions and communicate them to employees, who are expected to obey without offering suggestions or constructive dialogue (Rast et al., 2012). A significant limitation of autocratic leadership is that workers are disengaged, and if they are, they are not offered any opinions or concerns that are viable (Wang et al., 2022). Laissez-faire leadership works best when those being led are highly skilled and can work without supervision. However, in the context of manufacturing, this style of leadership may pose safety challenges (Robert & Vandenberghe, 2021).

Table 1, Comparison of the contribution of leadership styles to safety climate

Leadership Style	**Key Contribution to Safety Climate**	**Critical Insight / Limitation**	**Supporting Literature**
Transformational	Strong positive influences through motivation, trust, and safety commitment	Effects are often context-dependent; they may be less effective in highly regulated environments requiring strict compliance	Eagly et al. (2003); Alessa (2021); Clarke (2013)
Transactional	Promotes compliance with safety rules and procedures	Over-reliance may limit proactive safety behaviour and employee engagement	Bono & Judge (2004); Eğriboyun (2019); Clarke (2013)
Servant	Encourages open communication and reporting of safety issues	Limited empirical evidence in high-risk industrial settings; effectiveness may depend on organizational culture	Hunter et al. (2013); Dartey-Baah et al. (2021)
Autocratic	Ensures strict enforcement of safety regulations in hazardous environments	Can reduce employee voice and reporting, which are critical for long-term safety climate	Rast et al. (2012); Wang et al. (2022)

Laissez-faire	Minimal intervention may work with highly skilled employees	Consistently linked to negative safety outcomes and weak safety climate	Robert & Vandenberghe (2021); Clarke (2013)
Situational	Allows flexibility by adapting leadership to context	Lack of consistency may create unclear safety expectations among employees	Cai (2023); Sankar et al. (2023)

Overall, the literature suggests that no single leadership style is universally effective, rather, their impact on safety climate varies depending on organizational context, workforce characteristics, and operational risk levels, highlighting the need for a more integrated and context-sensitive approach.

2.3. MODERATING AND MEDIATING FACTORS OF THE RELATIONSHIP BETWEEN LEADERSHIP STYLES AND SAFETY CLIMATE

By considering various moderating and mediating factors organizations can better align leadership styles with the specific needs of their workforce, ultimately enhancing safety climate (Sankar et al., 2022). Organizational culture may facilitate or resist leadership efforts to strengthen the safety climate (Klein et al., 2013). Organizations which value innovation and employee involvement tend to benefit more from transformational leadership (Lasrado & Kassem, 2020). In contrast, bureaucratic cultures are more likely to see positive outcomes from transactional and autocratic leadership styles (Ouchi & Wilkins, 1985). Each employee comes with their own distinct characteristics, such as past work experience, and their personality (kónya et al., 2016). Demographics such as age, educational background, and work experience also influence the reaction towards different leadership styles (Thakur et al., 2024). Considering the working environment, in manufacturing, where there is a high risk due to the presence of heavy machinery, hazardous substances, and intricate processes, leadership is required to provide an absolute enforcement of safety standards (Umar, 2017).

This study extends existing literature by integrating multiple leadership styles, including less frequently examined styles such as servant, autocratic, and situational leadership, into a single empirical model to examine their combined influence on safety climate within the Sri Lankan manufacturing context, which remains underexplored.

3. Methodology

This study began by reviewing literature to examine the connections between different leadership styles and the safety climate in Sri Lankan manufacturing industries. The study adopted a quantitative research approach as the study aims to examine and measure the relationships between multiple leadership styles and safety climate dimensions using structured, numerical data. This approach is appropriate for identifying statistical associations and enabling generalization of findings across manufacturing settings (Creswell & Creswell, 2018; Saunders et al., 2019). Data collection relied on two established instruments: the Multifactor Leadership Questionnaire (MLQ) and the Safety Climate Questionnaire. The leadership portion encompassed 30 items, representing six leadership styles; transformational, transactional, servant, autocratic, laissez-faire, and situational/contingency. Specifically, 15 items were adapted from the MLQ (Bass & Riggio, 2006), focusing on transformational, transactional, and laissez-faire styles. The remaining

15 were newly formulated to address servant, autocratic, and situational leadership (Islam et al., 2025). Subsequently reviewed by two industry professionals for relevance and clarity. The safety climate section also comprised 30 items, organized into six core dimensions: safety communication and feedback, supervisory roles, peer influence and safety culture, management's commitment to safety, procedural compliance, and training/emergency preparedness.

All items utilized a five-point Likert scale (from 1, "Strongly Disagree," to 5, "Strongly Agree"). A preliminary study was conducted with a subset of participants to refine the instrument and assess reliability, and several items were revised for clarity and consistency. The study employed a purposive stratified sampling technique, selecting respondents from three manufacturing industries—apparel, food processing, and paint manufacturing to ensure representation of different industrial contexts. The questionnaire was self-administered, allowing respondents to complete it privately and thereby reducing the likelihood of response bias. Altogether 210 employees completed the questionnaires, from all ranks. The sampling strategy provided for a balanced cross-section of different levels that enabled an understanding of the perception of leadership at various levels of the organization. For instance, the sample size was considered adequate based on the requirement for correlation and multiple regression, which typically require a minimum sample size of 10–15 observations per predictor variable (Hair et al., 2019).

The data analysis was conducted using SPSS version 26, selected for its robust statistical capabilities and to establish relationships and leadership style predictors among the various safety climate dimensions. The reliability of the measurement instruments was evaluated using Cronbach's alpha coefficients. Measures such as frequencies, percentages, means, and standard deviations were used to provide an overview of the sample characteristics. Following this, Pearson's correlation analysis was employed to investigate the associations between six leadership styles and six dimensions of safety climate. Subsequently, multiple regression analysis was conducted to evaluate the predictive power of each leadership style on safety climate dimensions. Each dimension was treated as a dependent variable in a distinct regression model, with the six leadership styles serving as independent variables. Statistical significance was set at the 0.05 level. Key outputs included unstandardized coefficients (B values), significance levels (p-values), and R-squared values, collectively informing the interpretation of model fit and effect size.

4. Data Analysis and Discussion

4.1 PRELIMINARY ANALYSIS

The reliability of both questionnaires of Safety Climate and Leadership Styles, 60 research instruments, was evaluated using Cronbach's alpha test. The reliability analysis shows that all leadership style scales demonstrate acceptable to excellent internal consistency. Transformational, Transactional, Servant, and Autocratic leadership styles exhibit very high reliability ($\alpha > 0.94$), while Laissez-Faire ($\alpha = 0.775$) and Situational & Contingency leadership ($\alpha = 0.858$) also exceed the recommended threshold of 0.70. The overall leadership styles questionnaire ($\alpha = 0.783$) and the safety climate questionnaire

(α = 0.983) indicate strong reliability, confirming that the research instruments are suitable for further statistical analysis.

4.2. SAMPLE PROFILE

The present study considered 210 workers responses in several manufacturing facilities to the questionnaire distributed.

4.2.1. Demographic data -Job Role

According to Figure 1, the majority represented the 'Team member' category with 55% sample representation. Another 20% of the respondents were from the 'Operator' category, whereas 11% were from 'Supervisor' category. And 9% were from 'Manager' category. Only 5% of the sample represented 'Team leader' category.

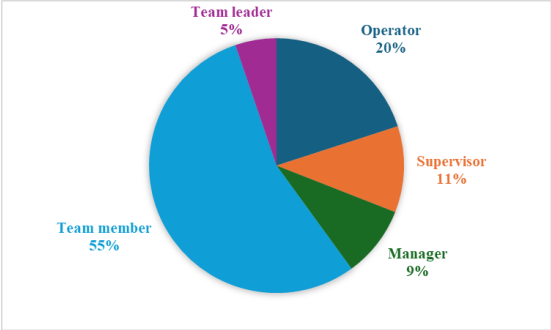

Figure 1, Demographic data-Job role

4.2.2. Demographic Data – Manufacturing facility Experience

According to Figure 2, the survey results, participants reported varying levels of experience within their current manufacturing facilities.

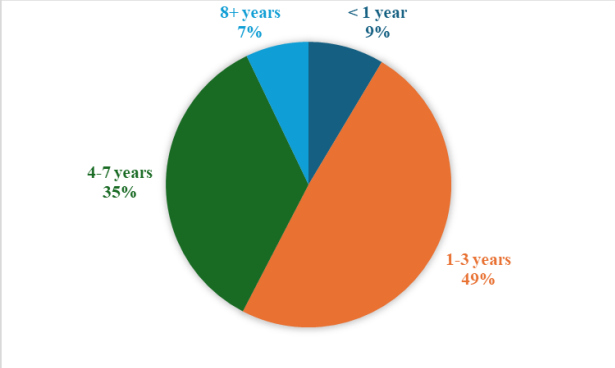

Figure 2, Demographic Data – Manufacturing facility Experience

This distribution indicates that the majority of the participants (49%) were in the early stages of their tenure, suggesting they are still developing familiarity with the organization. The second-largest group (35%), with 4 to 7 years of experience, is likely to represent employees who are more integrated into the organization. The smaller percentage

of employees with less than 1 year and more than 8 years of experience added valuable perspectives from both new entrants and long-serving personnel.

4.3. ANALYSIS OF THE RELATIONSHIP BETWEEN DIFFERENT LEADERSHIP STYLES AND SAFETY CLIMATE DIMENSIONS

Pearson's correlation analysis was conducted to identify the relationship between independent and dependent variables. Pearson's correlation coefficient (r) ranges from −1 to +1, where positive values indicate a higher level of relationship between leadership styles and safety climate dimensions, and negative values indicate an inverse relationship. According to Table 3 all reported correlations were statistically significant ($p < 0.05$), indicating that the relationships are unlikely to be due to random chance.

Table 2, Relationship between leadership styles and safety dimensions

Safety climate dimensions / **Leadership style**	Safety Communication and Feedback	Supervisor's Role in Safety	Peer Influence & Safety Culture	Management Commitment to Safety	Safety Procedures & Compliance Pressure	Training & Emergency Preparedness	Overall safety climate
Transformational Leadership (L1)	r = 0.251 p= 0.000	r = 0.187 p= 0.007	r = 0.172 p=0.012	r = 0.197 p=0.004	r = 0.105 p=0.128	r = 0.213 p=0.002	r= 0.188 p=0.006
Transactional Leadership (L2)	r = 0.187 p= 0.007	r = 0.21 p= 0.002	r = 0.244 p=0.000	r = 0.178 p=0.01	r = 0.219 p=0.001	r = 0.192 p=0.005	r = 0.206 p=0.003
Servant Leadership (L3)	r = 0.172 p= 0.012	r = 0.199 p= 0.004	r = 0.203 p=0.003	r = 0.233 p=0.001	r = 0.234 p=0.001	r = 0.205 p=0.003	r = 0.226 p=0.001
Autocratic Leadership (L4)	r = -0.801 p= 0.000	r = 0.178 p= 0.01	r = -0.667 p=0.001	r = -0.835 p=0.001	r = -0.765 p=0.001	r = -0.813 p=0.001	r = -0.839 p=0.000
Laissez-Faire Leadership (L5)	r = -0.344 p= 0.000	r = 0.219 p=0.001	r = -0.346 p=0.001	r = -0.366 p=0.001	r = -0.366 p=0.001	r = -0.361 p=0.001	r = -0.370 p=0.000
Situational & Contingency Leadership (L6)	r = -0.319 p= 0.000	r = 0.192 p=0.005	r = -0.351 p=0.003	r = -0.33 p=0.001	r = -0.275 p=0.001	r = -0.328 p=0.001	r = -0.325 p=0.000

4.3.1. Correlation Analysis between Leadership Styles and Safety Communication and Feedback

According to Table 1, transformational leadership had the strongest positive correlation with the Safety Communication and Feedback dimension ($r = 0.251$, $p < 0.001$). This finding supports Bass and Riggio (2006), who emphasized that transformational leaders foster trust and open dialogue, making employees more comfortable sharing safety concerns. Transactional leadership also showed a statistically significant positive correlation ($r = 0.187$, $p = 0.007$), indicating that structured leadership, grounded in rules and rewards, also supports communication, particularly when feedback is linked to performance outcomes. Servant leadership showed a moderate, yet significant correlation ($r = 0.172$,

p = 0.012). In contrast, autocratic leadership had a very strong negative correlation (r = -0.801, p = 0.000), suggesting that command-and-control styles create environments where employees feel discouraged from voicing safety concerns. Similarly, laissez-faire leadership (r = -0.344, p = 0.000) and situational/contingency leadership (r = -0.319, p = 0.000) also correlated negatively.

4.3.2. Correlation Analysis between Leadership Styles and Supervisor's Role in Safety

According to Table 1, findings indicate that laissez-faire leadership showed the highest positive correlation with the supervisor's role in safety (r = 0.219, p = 0.001), slightly higher than transactional leadership (r = 0.210, p = 0.002). While laissez-faire leadership is usually viewed negatively in safety literature, this result may suggest that in the specific context of Sri Lankan manufacturing, employees may interpret supervisory autonomy or non-interference as a sign of trust and empowerment. Transactional leadership showed a significant positive correlation that reflects empowering supervisors to manage safety performance effectively. Servant leadership (r = 0.199), situational leadership (r = 0.192), and transformational leadership (r = 0.187) also showed meaningful positive correlations with this dimension. Autocratic leadership also had a small but significant positive correlation (r = 0.178, p = 0.010). This partially aligns with findings in high-risk or rule-dominated environments where strict control can sometimes be viewed as a form of proactive enforcement.

4.3.3. Correlation Analysis between Leadership Styles and Peer Influence & Safety Culture

Table 1 presents the dimensions of Peer Influence and Safety Culture, which reflects how strongly coworkers support each other in following safety procedures, correcting unsafe behaviour, and reinforcing positive safety norms.

Transactional leadership had the strongest positive correlation with peer influence and safety culture (r = 0.244, p = 0.000). In manufacturing settings where standardization is critical, peers may hold each other accountable based on mutually understood performance benchmarks. Following that, servant leadership (r = 0.203, p = 0.003) also demonstrated a strong and statistically significant correlation. Also, transformational leadership (r = 0.172, p = 0.012) showed a positive correlation, indicating peers may be inspired by shared safety values rather than enforced policies, leading to stronger informal regulation of behaviour. On the other hand, autocratic leadership, laissez-faire and situational and contingency leadership showed negative correlations.

4.3.4. Correlation Analysis between Leadership Styles and Management Commitment to Safety

The dimension of Management Commitment to Safety (Table 1) is a critical foundation of an organization, reflecting how employees perceive leadership's investment in their health and safety. Servant leadership had the strongest positive correlation with this dimension. Transformational leadership also demonstrated a significant positive correlation (r = 0.197, p = 0.004), suggesting that visionary leaders inspire shared values and promote a long-term safety culture. Transactional leadership, while more performance- and

compliance-oriented, still showed a significant positive correlation (r = 0.178, p = 0.010). In contrast, autocratic leadership had a very strong negative correlation (r = -0.835, p = 0.001), suggesting rigid, top-down leadership is seen as disengaged from genuine safety care. Laissez-faire leadership and situational/contingency leadership also showed significant negative correlations.

4.3.5. Correlation Analysis between Leadership Styles and Safety Procedures & Compliance Pressure

Table 1 indicates the correlation coefficient and significant value (p value) between leadership styles and the Safety Procedures & Compliance Pressure dimension. Findings proved that servant leadership had the strongest positive correlation with this dimension (r = 0.234, p = 0.001), supporting the work of Vinodkumar and Bhasi (2010), who noted that servant leaders inspire voluntary compliance with safety protocols, not through fear or control, but through mutual respect and shared responsibility. Transactional leadership also showed a significant positive correlation (r = 0.219, p = 0.001) and Transformational leadership showed a moderate positive correlation (r = 0.178, p = 0.010). In contrast, other three leadership styles showed negative correlation, indicating that inconsistent or passive leadership leads to confusion about safety rules and procedures, undermining employee motivation to comply.

4.3.6. Correlation Analysis between Leadership Styles and Training & Emergency Preparedness

The dimension of Training and Emergency Preparedness in Table 1 reflects how well employees are trained to respond to hazards and emergencies, and how confident they feel in their preparedness. Transformational leadership had the strongest positive correlation with this dimension (r = 0.213, p = 0.002), supporting Bass & Riggio's (2006) assertion that transformational leaders enhance employee readiness by encouraging continuous learning. Servant leadership also showed a significant positive correlation (r = 0.208, p = 0.003), aligning with Liden et al. (2008), who found that servant leaders encourage developmental opportunities and personal growth. Transactional leadership had a moderately strong correlation (r = 0.207, p = 0.003). Conversely, autocratic leadership showed a very strong negative correlation with this dimension (r = -0.813, p = 0.001), confirming that overly controlling leaders create fear-based environments that reduce active participation in learning. Similarly, laissez-faire leadership (r = -0.347) and situational leadership (r = -0.309) negatively correlated with this dimension.

4.3.6. Relationship between Safety Climate and Leadership Styles

According to Table 1, overall Safety Climate captures the collective perceptions of safety culture, leadership support, communication, peer norms, compliance, and preparedness. Findings revealed that servant leadership had the strongest positive correlation with the overall safety climate (r = 0.226, p = 0.001), reinforcing the literature that servant leaders foster holistic engagement in safety through empathy, ethical behaviour, and employee empowerment. Transactional leadership followed closely with r = 0.217 (p

= 0.002), indicating rule-based leadership, when consistently applied leads to stable and predictable safety outcomes. Transformational leadership had a moderate but still significant correlation (r = 0.198, p = 0.004), confirming that leaders who inspire and promote shared safety values do contribute to a stronger safety culture. On the negative side, autocratic leadership again showed a very strong inverse correlation with overall safety climate (r = -0.845, p = 0.001). Similarly, laissez-faire (r = -0.360) and situational leadership (r = -0.330) were negatively correlated, reinforcing that absence or inconsistency in leadership leads to confusion, poor communication, and disengagement.

4.4. ANALYSIS OF THE IMPACT ON LEADERSHIP STYLES IN DIMENSIONS OF SAFETY CLIMATE

The results of Multiple Regression Analysis, offering insights into the individual impacts of independent variables (leadership styles), on various Safety Climate factors in manufacturing facilities. Table 4 provides the unstandardized coefficients and significance values of the contributions of each leadership style to workplace safety.

Table 3, Impact of leadership styles on safety climate dimensions

Safety climate dimensions **Leadership style**	Safety Communication and Feedback	Supervisor's Role in Safety	Peer Influence & Safety Culture	Management Commitment to Safety	Safety Procedures & Compliance Pressure	Training & Emergency Preparedness	Overall safety climate
Transformational Leadership (L1)	B=0.124 p= 0.000	B=0.096 p=0.054	B=0.153 p=0.000	B=0.144 p=0.000	B=0.079 p=0.109	B=0.147 p=0.001	B=0.744 p=0.001
Transactional Leadership (L2)	B=0.255 P=0.000	B=0.467 p=0.000	B=0.384 p=0.000	B=0.353 p=0.000	B=0.411 p=0.000	B=0.367 p=0.000	B=2.237 p=0.000
Servant Leadership (L3)	B=0.163 p=0.017	B=0.282 p=0.004	B=0.261 p=0.001	B=0.266 p=0.001	B=0.263 p=0.007	B=0.253 p=0.002	B=1.489 p=0.000
Autocratic Leadership (L4)	B=-0.457 p= 0.000	B=-0.684 p=0.000	B=-0.580 p=0.000	B=-0.612 p=0.000	B=-0.535 p=0.000	B=-0.548 p=0.000	B=-3.416 p=0.000
Laissez-Faire Leadership (L5)	B=0.084 p=0.314	B=-0.004 p=0.970	B=-0.069 p=0.491	B=0.077 p=0.429	B=-0.090 p=0.443	B=0.036 p=0.720	B=0.833 p=0.549
Situational & Contingency Leadership (L6)	B= -0.084 p= 0.295	B=-0.143 p=0.210	B=-0.026 p=0.785	B=-0.069 p=0.457	B=-0.054 p=0.632	B=-0.127 p=0.185	B=-0.504 p=0.307

4.4.1. Impact on Leadership Styles in Safety Communication & Feedback

According to Table 2, transactional Leadership exerts the strongest statistically significant positive impact, suggesting that leaders who are performance- and compliance-oriented significantly improve communication clarity and feedback mechanisms related to safety. Servant Leadership also displays a positive and statistically significant influence (B = 0.163, p = 0.017), highlighting the role of empathetic, service-driven

leadership in enhancing trust and openness among employees. In contrast, Autocratic Leadership has a marked negative effect (B = -0.457, p = 0.000), reflecting the detrimental impact on a top-down, control-oriented approach. On the other hand, Laissez-Faire, and Situational Leadership do not show statistically significant associations (p-values of 0.314,0.295 respectively), indicating their influence on this dimension may be minimal or context-dependent within the surveyed manufacturing environments.

4.4.2. Impact on leadership style in Supervisor's Role in Safety

Table 2 indicates that transactional Leadership, which demonstrates a strong positive association with a coefficient of 0.467 and a p-value of 0.000. Following that, servant Leadership (B = 0.282, p = 0.004) also contributes positively to this domain. Notably, Autocratic Leadership has a significantly negative effect (B = -0.684, p = 0.000), suggesting that when leadership relies on authority and rigid control, supervisors may lack autonomy or motivation, which weakens their role in upholding safety. Similar to the previous dimension, Transformational, Laissez-Faire, and Situational Leadership were not statistically significant, implying limited relevance to how supervisors engage with safety.

4.4.3. Impact on leadership style in Peer Influence & Safety Culture

Findings (Table 2) revealed that transactional Leadership as the most positively impactful (B = 0.384, p = 0.000), demonstrating that clear reward structures and rule enforcement foster peer accountability and create a collective adherence to safety culture. Servant Leadership also has a notable positive impact (B = 0.261, p = 0.001), reinforcing the idea that when leaders cultivate trust and interpersonal concern, they inspire a collaborative safety culture. Autocratic Leadership, however, remains a negative influence (B = -0.580, p = 0.000), which undermines collaboration and mutual reinforcement of safety behaviours among employees. Other leadership styles, such as Transformational, Laissez-Faire, and Situational, do not show significant relationships (p-values of 0.083, 0.427, and 0.102), suggesting their impact on peer-driven safety culture is negligible in these facilities.

4.4.4. Impact on leadership style in Management Commitment to Safety

As per Table 2, transactional Leadership is once again the most influential, with a highly significant positive relationship (B = 0.353, p = 0.000), implying that managers perceived as consistent and reward-driven are viewed as being more committed to safety. Servant Leadership (B = 0.266, p = 0.001) and Transformational Leadership (B = 0.144, p = 0.000) also show statistically significant positive effects, suggesting that leaders who inspire employees or prioritize their needs contribute to the perception that management is genuinely committed to safety. Autocratic Leadership consistently shows a negative influence, highlighting how it creates a perception of disinterest or detachment from safety concerns. The Laissez-Faire and Situational styles, with p-values of 0.489 and 0.228, remain statistically insignificant.

4.4.5. Impact on leadership style in Safety Procedures & Compliance Pressure

According to Table 2, the most substantial positive impact is given by transactional Leadership (B = 0.411, p = 0.000), reinforcing its role in promoting compliance through structured oversight and expectation setting. Servant Leadership also maintains a positive, statistically significant effect (B = 0.263, p = 0.007), suggesting that when employees feel supported and valued, they are more willing to follow procedures and internalize safety responsibilities. Autocratic Leadership exhibits a negative relationship (B = -0.535, p = 0.000), reflecting how rigid control suppresses intrinsic motivation to comply, possibly leading to resistance. Other leadership styles, Transformational, Laissez-Faire, and Situational, do not reach statistical significance (p-values of 0.109,0.443,0.632), indicating no substantial contribution to this dimension in the observed context.

4.4.6. Impact on leadership style in Training & Emergency Preparedness

As per Table 2, this dimension shows a positive influence from three leadership styles. Transactional Leadership again ranks highest in impact (B = 0.367, p = 0.000), demonstrating that structured, goal-oriented leadership improves engagement in training programs and preparedness for emergencies. Servant Leadership (B = 0.253, p = 0.002) follows closely, suggesting that empathetic leadership encourages employees to value and participate in safety training. In contrast, Autocratic Leadership has a negative influence (B = -0.548, p = 0.000), reflecting a discouraging effect on training engagement. Laissez-Faire and Situational Leadership styles are again non-significant (p-values of 0.191 and 0.237), showing little impact on this safety aspect.

4.4.7. Impact on leadership style in Safety Climate

In terms of the cumulative safety climate score, which aggregates all six dimensions, the regression model illustrates a compelling trend. Transactional Leadership stands out as the most influential style (B = 2.237, p = 0.000), highlighting its comprehensive effect across all aspects of workplace safety. Servant Leadership and Transformational Leadership contribute significantly to the overall safety climate. Predictably, Autocratic Leadership exerts a major negative effect (B = -3.416, p = 0.000), confirming its detrimental role across all safety dimensions and its alignment with fear-based or compliance-heavy cultures. Laissez-Faire and Situational Leadership styles again demonstrate no statistically significant impact (p-values of 0.216 and 0.131), indicating that passive or inconsistent leadership approaches do not significantly shape the broader safety climate in manufacturing facilities.

4.4.8. Model Summary

Table 4, Safety Climate Impact Matrix

Safety Dimension	Transformational	Transactional	Servant	Autocratic	Laissez-Faire	Situational
Safety Communication & Feedback	Moderate	Strong	Moderate	Strong Negative	Negative	Negative
Supervisor's Role in Safety	Weak /Moderate	Strong	Moderate	Moderate Negative	No Impact	No Impact
Peer Influence & Safety Culture	Weak	Strong	Moderate	Strong Negative	Negative	No Impact
Management Commitment to Safety	Moderate	Strong	Moderate	Strong Negative	No Impact	No Impact
Safety Procedures & Compliance	No Impact	Strong	Moderate	Moderate Negative	No Impact	No Impact
Training & Emergency Preparedness	Moderate	Strong	Moderate	Strong Negative	No Impact	No Impact

Table 4 presents the model summary for the regression analysis of leadership styles' impact on the overall Safety Climate Score. The R value is 0.914, which indicates a very strong positive correlation between the independent variables (leadership styles) and the dependent variable (total safety climate score). This strong correlation implies that changes in leadership styles are closely associated with changes in the overall safety climate within manufacturing facilities. The R-squared value is 0.835, meaning that 83.5% of the variance in the total safety climate score is explained by the combined effects of leadership styles. This is a remarkably high explanatory power for a social science study and strongly reinforces the argument that leadership behaviour is a central factor in determining the effectiveness and maturity of safety culture in industrial settings. The remaining unexplained variance (16.5%) could be attributed to other factors not included in the current model, such as organizational policies, employee attitudes, or external influences like regulations.

5. Conclusion

This study confirms that leadership style is a decisive factor in shaping safety climate within Sri Lankan manufacturing facilities. Using MLQ and Safety Climate questionnaires from 210 employees across apparel, food processing, and paint industries, the findings demonstrate that transformational, servant, and transactional leadership styles significantly enhance safety climate dimensions. Transformational and servant leadership showed the strongest influence, particularly in safety communication, supervisory support, peer influence, and emergency preparedness. Transactional leadership positively contributed to procedural compliance and structured safety implementation. Correlation and regression analyses revealed strong predictive power ($R^2 = 0.835$), indicating that leadership styles explain 83.5% of the variance in overall safety climate. Conversely,

autocratic and laissez-faire leadership styles exhibited weak or negative relationships with safety dimensions, highlighting the limitations of authoritarian and disengaged leadership approaches in safety-sensitive environments. Based on the findings, it is recommended to invest in transformational and servant leadership development, integrate safety metrics into performance evaluations, and retain structured transactional practices for compliance monitoring in organizations. Autocratic and passive leadership behaviours should be minimized through leadership training and accountability systems. However, this study is limited by reliance on self-reported data and focuses on three industries within one national context. While this study identified several potential moderating and mediating factors from the literature, these were not empirically tested, as the focus was limited to examining direct relationships between leadership styles and safety climate. Future research should incorporate these variables using more advanced analytical approaches to better understand the underlying mechanisms and contextual influences. In addition, future research should explore leadership and safety climate relationships within specific manufacturing sectors and compare different workplace cultures to better understand contextual and cultural influences on safety outcomes.

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