

Green Transformational Leadership and Employees' Sustainable Behaviour Among Selected Manufacturing Smes in North Central Nigeria. The Role of Green Innovative Behaviour

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Abstract

In light of the increasing trend for innovation through leadership for creating resilient organizations, there has been an increased interest in green transformational leadership as one of the major determinants that contribute to fostering green innovation among the employees within most organizations. In essence, comprehending the behavioural process that involves the creation of innovative behaviour by the leaders is important in theory and practice. Social Exchange Theory and Social Learning Theory have been considered as underpinning and supporting theories since they provide that the reward system in the organization could be utilized in creating better attitudes and behaviours of employees, as well as acting as role models for the leaders. Quantitative research method was adopted, with the utilization of structured questionnaires distributed among employees of manufacturing SMEs. Data analysis involved the use of Partial Least Squares Structural Equation Modelling. The contribution made by this paper

includes the concept of green transformational leadership as an innovative management approach that assists manufacturing SMEs in overcoming the environmental concerns through green innovative behaviour. Practically, provision of useful knowledge to employees in manufacturing SMEs for implementing green innovations. Additionally, their management can embrace innovative leadership practices so as to attain sustainable practices in the future. The study makes several policy prescriptions aimed at providing a conducive environment for the quick adoption of sustainable practices. The results show that leadership plays a critical role in fostering sustainability practices.

Keywords: Green Transformational Leadership, Employees' Sustainable Behaviour, Green Innovative Behaviour, Manufacturing SMEs, North Central Nigeria.

1. Introduction

It has come to the forefront in studies in the area of small and medium-scale enterprises manufacturing regarding their sustainable behaviour due to their

substantial environmental footprint, as well as the vital role that employees can play in the production process. The resource intensity associated with operations in manufacturing includes high usage of raw materials, high energy intensity, and high wastage levels making sustainable employee behaviour an essential component in ensuring environmental performance (Çop et al., 2021; Daily et al., 2009; Jabbour & Santos, 2008). The increase in sustainability pressures on firms worldwide has led to companies taking more innovative approaches toward creating sustainable change, changing their mindsets and improving operational performance (Kaplan & Iyer, 2021; Van Holt et al., 2020). Nevertheless, such a paradigm cannot be achieved without the active involvement of employees (Francis & Si, 2015). It becomes imperative for organisations to manage employee sustainable behaviours effectively because employees are at the forefront in planning, implementing, and executing green initiatives to create sustainable organisations (Rezapouraghdam et al., 2019). Achieving sustainable behaviour is a major concern for manufacturing organisations, thus the need to promote sustainable practices. Moreover, achieving sustainable behavioural changes among employees is essential for sustainable behaviour. Lu et al. (2017) noted that the vast majority of companies focus on changing and transforming the system during the implementation of environmental management practices rather than encouraging employees' green innovative behaviour. According to Zhang et al. (2020b), employees have an important role in organizational sustainability and are able to improve it through their actions (Ahuja et al., 2019). Some examples of sustainable behaviour on the part of employees identified in the literature include energy savings, concern for other employees, material recycling, or innovative ideas to mitigate the environmental effect of products produced by an organization (Ciarnien 'e ' et al., 2020). To improve the environmental performance of an organization as part of its CSR activities, it is necessary to encourage employees' engagement in sustainable behaviour (Zientara and Zamojska 2018). Therefore, green innovative behaviour may contribute to the improvement of the organizational image and ensure

competitive advantage. The influence of SMEs on the economy of the world in introducing sustainability practices and utilizing new green technologies remains rather difficult because of the lack of resources and knowledge about such technologies (International Council for Small Business, 2024; World Economic Forum, 2025). This has led to the gradual incorporation of sustainable practices among SMEs in the industrial sector when compared to large enterprises, which are already reaping the benefits of sustainability in areas such as energy conservation, minimising environmental footprint, sustainable packaging, sustainable purchasing, zero waste and sustainable economy (OECD, 2025; Hermundsdottir & Aspelund, 2022). The Nigerian Government has put in place support programs for helping SMEs to address the issue of inadequate funds, lack of competence, poor infrastructural development and market restriction (Hyland, 2023 as cited in Ahmadu et al, 2025). Examples of some of the programs put up by the Nigerian government include the AGSMEIS (Agribusiness Small and Medium Enterprises Investment Scheme) of the Bankers' Committee and the Anchor Borrower Program of the CBN. These programs were set up to alleviate these problems through providing loans, grants and palliatives and carrying out skill training for the owners of small scale businesses (Odediran, 2022 as cited in Ahmadu et al, 2025). This research will help fill these gaps through examining the effect of green transformational leadership on employee's sustainability behaviours with the mediatory effect of green innovation behaviours among other things.

2. Literature Review and Hypotheses Development

2.1 Green Transformational Leadership

The GTL concept is defined as the conduct of transformational leaders whose main aim is to offer vision and inspiration to motivate and encourage their employees to realise the sustainability goals of their organisations (Benevene & Buonomo, 2020; Ren, et al., 2018; Perez, et al., 2023). Transformational leaders inspire their followers or employees to help them achieve organisational goals as they have vision and foresight that help them plan

their current and future goals, and the ability to create innovative visions and implement them through motivation (Asadi et al., 2020). Green Transformational leaders look at ways of investing in models, technologies, and programs to deal with carbon emissions and efficient use of natural resources (Graves et al., 2013; Begum, 2022). The GTL helps minimise the negative impacts of industrial pollution to the environment (Li et al., 2020; Wang et al., 2018). Green Transformational leaders must serve as exemplary role models in the promotion of environmental protection within their organisations (Srouf et al., 2020).

2.2 Employees' Sustainable Behaviour

Employees' Sustainable Behaviour refers to discretionary and consistent employee behaviour that plays an important role in enhancing the sustainability of their organisations socially, economically and environmentally (Robertson & Barling 2017). Maxim et al. (2024) believe that building sustainable employee behaviours necessitates effective organisational support, human resource management strategies, a strong system, and sufficient rewards. Once the above-mentioned steps are accomplished, it is likely to bring about increased productivity and foster a culture of stewardship and innovation in the organisation. Examples of employees' sustainable behaviours include energy-saving, reuse of materials, being compassionate to other employees, and effectively communicating new and innovative ways to reduce any negative impact on the environment (Ciarnien et al., 2020). As described by Pellegrini et al. (2018), employees' sustainable behaviour can be understood as responsible organisational behaviour that leads to positive results not only in terms of business but also environmentally. Furthermore, organisational internal management strategies play a key role in fostering sustainable employee behaviours through shaping their perceptions of organisational responsibility and proper behaviour within the organisation (Pellegrini et al., 2018).

2.3 Green Innovative Behaviour (GIB)

Green innovative behaviour (GIB) is described as an employee's capability to generate new ideas and

implement them in the organisation (Scott & Bruce, 1994, as cited in Widyanty et al., 2025). The emergence of issues like weather hazard, environmental pollution and habitat loss in the world has led to the need for promoting GIB among policy makers (Ogiemwonyi & Harun, 2020). It can be understood that GIB involves the creation, development and imagination of environmental innovations within the organisation by employees (Stankevičiūtė et al., 2020). GIB has proved to be influential in increasing organisational sustainability performance and minimising waste generation (Song et al., 2023; Bhatti et al., 2022). In a similar fashion, green innovative behaviour among employees can be regarded as a form of sustainable and environmentally friendly behaviour in terms of performing duties and generating new products and services (Rongbin et al., 2022). GIB is concerned with the creation of new ideas, processes, products or services having profound influence on the environment (Wang et al., 2021; Alnaqbi et al., 2024). It can be said that an innovative employee works voluntarily to increase the efficiency of the organisation in order to curb environmental pollution (Shafaei-Darastani & Nejati-Ajibisheh, 2023). GIB has a remarkable impact on organisations in enhancing environmental performance, minimising environmental pollution, strengthening organisational reputation and promoting employee engagement (Alnaqbi et al., 2024; Hamann et al., 2021).

2.3 Theoretical Review

Social Exchange Theory (SET) is among the most significant theories in the area of social psychology, developed by scholars such as Homans (1961), Blau (1964) and Emerson (1962, 1972). The Social Exchange Theory posits that there is a sense of reciprocal obligation because of organizational rewards and related behaviours for the evaluation of whether supportive leadership and organizational support motivate or demotivate the behaviour of workers. Workers, when they think that they are valued, recognized, respected and supported (benefits), develop an obligation to show good behaviours (cost). This suggests that the organizational reward system has a positive effect on

the attitude and behaviour of workers. Social Learning Theory was first postulated by Bandura (1977). This theory holds that people learn behaviours and norms in the context of their societies through imitation and modelling of others. Individuals learn through observing the actions of role models as well as thinking of the consequences of their actions.

2.4 Employees' Sustainable Behaviour and Green Transformational Leadership

The link between Green Transformational Leadership (GTL) and sustainable actions by employees is essential in developing environmental activities within organizations. GTL refers to leaders who motivate and inspire their subordinates to participate in sustainable activities (Chen & Chang, 2013). According to Saleem et al. (2021) who explored how effective ethical leadership promotes green behaviour among employees by fostering the right organizational climate, their results indicated that such climate ensures that employees are environmentally responsible and set their goals to be aligned with environmental ones for the development of sustainable actions. Zacher et al., (2024) further noted that leaders who can pass environmental messages well play a significant role in developing organizational culture that encourages employees to participate in sustainable behaviours. By adopting the values of GTL within the organizational culture, there is an influence on the expected behaviour by employees to attain sustainability. Social Exchange Theory provides explanation on how employees return environmentally friendly behaviours by leaders through sustainable behaviour. GTL provides socio-economic and instrumental supports that ensure high quality leader-member exchange. This relationship also aligns with SLT by laying the foundation for learning, modelling and adapting environmental behaviour, inspiring employees to embrace environmental goals and adopt green practices through learning, observation and imitation. It is expected that leaders with a high level of green management skills will transform the organisation to be sustainable (Khan & Ansari, 2024).

H01: There is no significant association between Employees' Sustainable Behaviour and Green Transformational Leadership.

2.5 Green Innovative Behaviour and Green Transformational Leadership

An increasing number of researchers are aware of the importance of green transformational leadership for the advancement of personal and environmental performance (Shahab et al., 2020). Green transformational leaders serve as a catalyst that motivates, inspires, and encourages their teams to change from conventional standards and take on green initiatives and green behaviours (Begum et al., 2022). GTL consists of five vital features, which are: visionary outlook, encouraging leadership, intellectual stimulation, motivational communication and individual acknowledgement (Rafferty & Griffin, 2004). GTL engages in problem-solving and creative thinking for the organisation and carries its team along, thereby performing a crucial role in promoting a positive image and innovative behaviour in the organisation (Rasheed et al., 2021; Shah et al., 2023). Green transformational leaders are role models that set examples for their team members to follow; this includes fostering innovation in the workplace, modelling green innovative behaviour, leading and inspiring employees to practise green creativity (Ding et al., 2023). Employees take on more risk in green creativity and innovation when green transformational leaders instil confidence in them (Ding et al., 2023). By applying Social Exchange Theory, which describes why employees get motivated to put in efforts towards green innovative behaviour. The link also conforms to the SLT, whereby the leader acts as a model due to his/her position (Brown et al., 2005). By imitating the GTL approach, the upper-level manager can develop green competencies in the organization (Ahmad et al., 2024); shape the attitudes and values of the employees and foster their engagement with nature in dealing with environmental issues (Begum et al., 2022a; Cui et al., 2023).

H02: There is no significant association between Green Innovative Behaviour and Green Transformational Leadership.

2.6 Employees' Sustainable Behaviour and Green Innovative Behaviour

Most researchers have posited that green innovative behaviour significantly influences the development of sustainable behaviour in integrating environmental factors into organisational processes. As sustainability becomes more popular, organisations move forward in acquiring competitive advantage in the market place (Sagar, 2023; Afeltra et al., 2022). The study by Faizan et al. (2023) showed that the adoption of green human resource management strategies helps develop green innovative behaviour and promotes the sustainable performance of manufacturing firms. This aligns with the findings of the theories mentioned above which include the Social Exchange Theory and the Social Learning Theory. Social Learning Theory is vital in appreciating the ways employees can learn green innovative behaviour through observing other people around them like their bosses and co-workers. However, according to Social Exchange Theory, green innovative behaviour denotes a valuable contribution that goes along with an exchange relationship. When the contributions of innovative behaviour are valued, employees will perceive reciprocity from the organisation. This promotes commitment to sustainable behaviour. Thus, the following hypothesis was formulated:

H03: There is no significant association between Employee's Sustainable Behaviour and Green Innovative Behaviour.

2.7 Green Innovative Behaviour as a Mediator

The importance of green transformational leadership (GTL) and employees' sustainable behaviour and green innovative behaviour as a mediator cannot be ignored. Previous studies have investigated the relationships between them and shown that GTL helps build the organizational culture and facilitates green innovations and sustenance activities into operational activities (Alshimmari & Shneikat, 2025;

Begum et al., 2022). GTL helps foster green innovations through new idea generation among employees by improving communication. Leaders should promote an innovative climate to facilitate environmental initiatives, which will, in turn, enhance sustainable practices. Azizie et al. (2025) further illustrated that GTL motivates green employee engagement, which leads to environmental sustainability. Their results revealed that GTL and green employee engagement are interconnected through green innovative behaviours, which are crucial for attaining sustainability goals. Drawing on SET, when employees perceive organisational support for environmental sustainability, they generate environmentally friendly ideas, promote sustainable processes, strengthen environmental efficiency, encouraging green product innovation. SLT is consistent with this relationship as green transformational leaders are influential role models who demonstrate the value of conservation and sustainable innovation (Zaremohzzabieh & Rasdi, 2023). When employees adopt these behaviours, sustainable innovation becomes a collective effort that promotes sustainable behaviour.

H04: There is no Mediating Effect of Green Innovative Behaviour on the Relationship Between Green Transformational Leadership and Employee's Sustainable Behaviour.

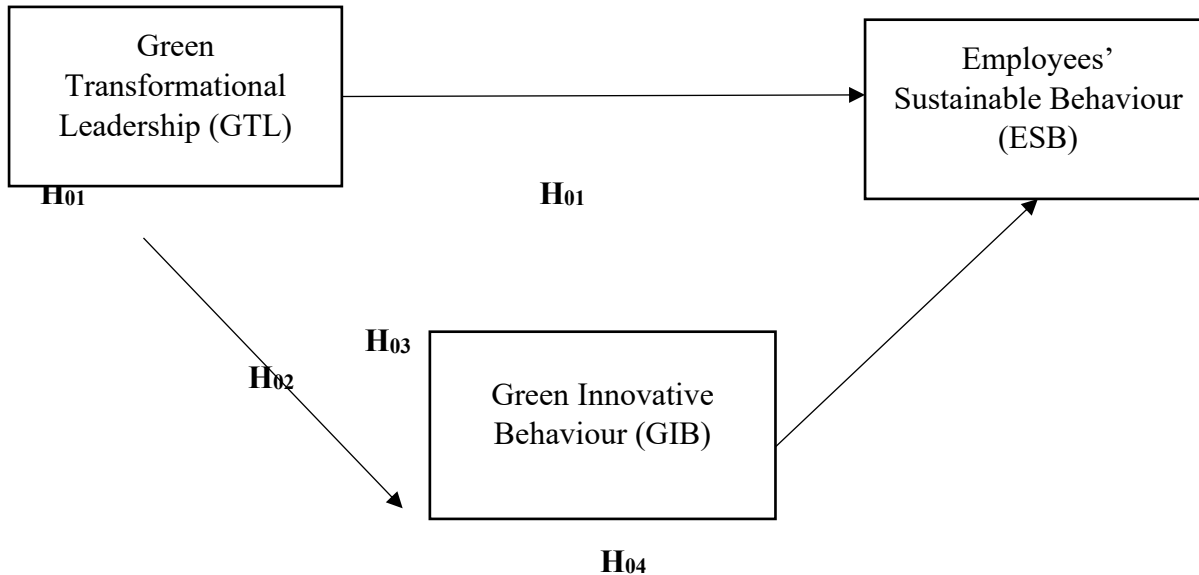


Figure 1: Conceptual Framework of Green Transformational Leadership and Employees' Sustainable Behaviour.

Source: Author's Conceptualisation (2026).

3. Research Methods

3.1 Research Design

A Quantitative design is used to conduct this study since it provides a proper framework for analysing the direct relations between the variable of the study such as green transformational leadership, green innovative behaviour, and sustainability of employees' behaviour.

3.2

3.3 Sample and Data Collection

The study population for the study comprises of 1,440 workers selected from selected Manufacturing SMEs in North Central, Nigeria, that have already adopted sustainable practices. Respondents were randomly selected from each stratum based on their job grades. Proportionate allocation was applied to the employee population to determine the sample size of 313 employees, using the formula proposed by Taro Yamane (1967).

3.4 Measurement of Instruments

The measurement scale of GTL has been adopted by Chen & Chang (2013) based on the findings of Ding et al., (2023) on six items. The measurement scale of green innovative behaviour has been created based on the findings of green service innovative behaviour by Hu (2009), which has been adapted based on

Jameel et al., (2025). The measurement scale for Employees' Sustainable Behaviour has been adopted by Norton et al., (2014) which was further adapted by Hameed & Siddiqui (2024). The five point Likert scale has been adopted from 1 = strongly disagree to 5 = strongly agree.

4.1 Descriptive Statistics

Descriptive statistics were computed to provide a conceptual overview of the key constructs examined

in this paper: green transformational leadership (GTL), green innovative behaviour (GIB), and employees' sustainable behaviour (ESB). The results show relatively high mean scores across all constructs. This suggests that respondents generally understand green leadership practices and sustainability-oriented behaviours within their organisations.

Table 1 Descriptive Statistics of Study Constructs

Construct	Number of Items	Mean	Standard Deviation	Interpretation
Green Transformational Leadership	6	3.77	0.73	High
Green Innovative Behaviour	6	3.83	0.71	High
Employees' Sustainable Behaviour	6	4.01	0.66	High

As indicated in Table 1, all variables presented high mean values, which were above 3.40, indicating that all the statements related to sustainable practices in the organizations were confirmed by the high mean values and low standard deviation

Correlation Results

Table 2: Pearson Correlation Results

Hypothesis	Relationship	r	p	Strength	Decision
H1	GTL and ESB	0.62	0.000	Strong	Reject H0
H2	GTL and GIB	0.55	0.000	Strong	Reject H0
H3	GIB and ESB	0.53	0.000	Strong	Reject H0

The results in Table 2 shows that all hypothesised relationships positively statistically significant at 5% level of significance.

extent to which a set of items is consistent in measuring the construct being evaluated.

4.2 Reliability Analysis of the Research Instrument

Reliability tests were carried out to test the consistency of the measurement scale used in the research work. Reliability test was performed using the Cronbach's Alpha statistic, which evaluates the

Table 3 Reliability Statistics of Study Constructs

Construct	Number of Items	Cronbach's Alpha	Interpretation
Green Transformational Leadership (GTL)	6	0.925	Excellent
Green Innovative Behaviour (GIB)	6	0.910	Excellent
Employees' Sustainable Behaviour (ESB)	6	0.889	Good

As observed in Table 3, the reliability statistics of all constructs show that they have high internal consistency. First, the construct Green Transformational Leadership had a Cronbach's Alpha of 0.925 implying a very high level of reliability of the six items used to measure the construct. Similarly, Green Innovative Behaviour had a high reliability value of 0.910 indicating that its items are highly consistent. Again, the Cronbach's Alpha of employees' Sustainable behaviour was 0.889 showing good reliability of the construct's items. In general, all Cronbach's Alpha values of constructs are above the acceptable threshold of 0.70. Consequently, no item was deleted from the measurement scale.

5 Findings and Analysis

The conclusions offer valuable information about the quality of measurement as well as theoretical relationships examined in this paper. First, the results of reliability confirm that all constructs have high internal consistency, which means that measurement items have successfully captured all their underlying aspects. Therefore, adapted instruments are applicable in measuring green leadership as well as sustainability related behaviours among employees in the research setting.

In addition, the validity of construct was tested and proved that the instrument design is correct as it reflects three constructs. This means that the subjects have been capable of differentiating between green transformational leadership, green innovative behaviour, and sustainable behaviour of employees. The conclusions can be made that one becomes confident about including all concept elements into the instrument. Finally, testing of hypotheses has become the evidence of validity of the suggested

model. Namely, Green Transformational Leadership correlated positively and strongly with Employees' Sustainable Behaviour ($r=0.62$) and Green Innovative Behaviour ($r=0.55$). These results show that the responsible attitude of leaders to the environment could be the important factor influencing employee innovations connected with sustainability. Furthermore, Green Innovative Behaviour was found to correlate strongly with Employees' Sustainable Behaviour ($r=0.53$).

5. Discussions

In this study, associations between green transformational leadership and employees' sustainable behaviour were investigated. Moreover, green innovative behaviour was considered as a mediator in the relationship between these variables. Results received from the research provide important insights into the quality of measurement tools and relationships between the discussed concepts that were predicted by the author in the theoretical part of the study. First of all, it is necessary to note high internal consistency of the constructs that was demonstrated by high reliability scores for measurement tools used for assessment. According to the results of hypothesis testing, some empirical support can be found for the assumptions stated above. Specifically, Green Transformational Leadership had positive relationships with Employees' Sustainable Behaviour ($r = 0.62$) and Green Innovative Behaviour ($r = 0.55$). This result implies that an emphasis on the environmental aspects of business activities performed by the leader contributes greatly to innovation and sustainability among employees. In addition, Green Innovative Behaviour and Employees' Sustainable Behaviour

showed a significant correlation ($r = 0.53$), indicating that innovation initiated by employees is crucial for achieving organizational sustainability. Thus, the above-mentioned results can be fully explained by Social Exchange Theory and Social Learning Theory.

5.1 Implications

Theoretical Implications: The current study enhances the body of knowledge on green transformational leadership in that it empirically demonstrates how green transformational leadership is able to have a significant effect on the sustainable behaviour of employees in the selected manufacturing SMEs of North Central Nigeria. Integrating the theories of social exchange and social learning in order to elucidate the green innovation of employees.

Implications for Practice: There are several implications from the findings that could help entrepreneurs, managers, SME owners, and policymakers. Managers and SME owners must adopt green transformational leadership behaviours. Such behaviours include conveying an environmental vision, fostering environmentally sustainable behaviour among the followers, and setting a good example.

5. Limitations and direction for further research

These findings highlight certain limitations, which can perhaps become a focus for future research endeavours. The current investigation examined some selected manufacturing SMEs from the North Central geopolitical area of Nigeria. This geographical location comprises seven states, which are: Benue, Kogi, Niger, Nassarawa, Plateau, Kwara, and FCT Abuja. Conducting the study within a single geopolitical area rather than in the whole country could be considered another limitation of this paper. Future research may want to conduct their work using a longitudinal approach, which is more appropriate when studying change in employees' sustainable behaviour and green innovation behaviour over a long period of time. Present

research applies cross-sectional methodology and does not test indirect relationships between the studied variables.

6. Conclusion

The study aimed at assessing the relationship between green transformational leadership and employees' sustainable behaviour, with particular focus on the mediating effect of green innovative behaviour in manufacturing small-and-medium scale enterprises in North Central Nigeria. It was established that green transformational leadership has an important part to play in developing sustainable behaviour among employees. Green leaders who practice environmentally friendly activities and increase the shared vision of sustainability will be expected to encourage sustainable behaviour among their employees. This study also underscores that green transformational leadership encourages green behaviour among employees, which results in sustainable behaviour in the organizations. Green innovative behaviour is said to act as a mediator in this case because green leadership works not just directly but also indirectly through the ability of employees to come up with innovative behaviours that are environmentally friendly.

9. Recommendations

From the findings presented in this paper, there is a need for the following recommendations.

1. The managers of the SMEs, entrepreneurs, and owners should adopt the green transformational behaviours where they inspire the workers to be environmentally friendly.
2. There should be an adoption of structures that encourage innovative green behaviour. The structure can be created through embedding environmental innovation within the organization's culture.
3. The manufacturing SMEs should adopt sustainability in their business operations as opposed to making it part of non-core activities.

4. The policy makers and government agencies should assist the Manufacturing SMEs in acquiring funds and access to development programs to implement the green projects.
5. The manufacturing SMEs should ensure that there are continuous training programs for their workers for the purpose of gaining sustainable knowledge.

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