



Organisational Sustainability Orientation in the Automobile Context: An Empirical Study of Environmental, Operational, Product and Administrative Factors in Kolkata, India

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Abstract

Purpose

The relationship between population dynamics, resource constraints and sustainable development has become increasingly important in the context of environmental degradation, resource scarcity and the transition toward sustainable production systems. Although the population–environment nexus has received substantial theoretical attention, less attention has been devoted to understanding how organisational sustainability orientations are reflected through specific managerial and operational dimensions within emerging-market contexts. This study investigates the organisational factors associated with perceived sustainability orientation in the automobile context, focusing on administrative consciousness, product consciousness, operational consciousness and cost consciousness.

Methodology

The study adopts an exploratory and descriptive quantitative research design. Primary data were collected through a structured questionnaire using five-point response scales. The supplied SPSS dataset contains 80 observations. Reliability analysis, correlation analysis and multiple regression analysis were conducted to examine the relationships between organisational sustainability consciousness and four explanatory dimensions. The empirical analysis was supplemented by examination of the measurement structure of the sustainability-related items.

Findings

The reliability analysis demonstrates satisfactory internal consistency for the 12-item sustainability-related scale (Cronbach's $\alpha = .812$). The four focal explanatory variables demonstrate significant positive associations with perceived sustainability orientation. Administrative consciousness correlates strongly with sustainability orientation ($r = .785$), followed by product consciousness ($r = .762$), operational consciousness ($r = .712$), and cost consciousness ($r = .305$). The multiple regression model is statistically significant, $F(4, 75) = 88.36, p < .001$, explaining approximately 82.5% of the variance in sustainability orientation ($R^2 = .825$; adjusted $R^2 = .816$). Product consciousness demonstrates the largest standardized effect ($\beta = .437$), followed by cost consciousness ($\beta = .334$), administrative consciousness ($\beta = .270$), and operational consciousness ($\beta = .251$).

Implications

The findings suggest that organisational sustainability should not be understood exclusively as an environmental compliance issue. Rather, sustainability orientation appears to be embedded in product-related decisions, cost consciousness, administrative commitment and operational practices. The study contributes empirical evidence from an emerging-market setting and provides implications for organizations seeking to integrate sustainability into managerial and production systems.

Keywords: *organisational sustainability; sustainable production; environmental sustainability; automobile industry; product consciousness; operational consciousness; administrative consciousness; India*

1. Introduction

Sustainable development has increasingly become a central concern for governments, businesses and society because economic activity is inseparable from the consumption of energy, materials and ecological resources. The relationship between population dynamics and sustainable development is particularly complex because population growth simultaneously expands the available labour force and consumer market while increasing aggregate demand for food, energy, infrastructure and natural resources. The United Nations identifies population growth as interconnected with economic, social and environmental dimensions of sustainable development, including resource use and environmental degradation. ([United Nations](#))

The population–environment relationship, however, cannot adequately be understood through a simple causal proposition in which population growth automatically produces environmental deterioration. Contemporary scholarship emphasizes that environmental outcomes depend not only on the number of people but also on patterns of consumption, production technologies, institutional arrangements, economic development, resource efficiency and human behaviour. ([PubMed Central \(PMC\)](#))

This debate is particularly relevant to the automobile sector. Automobile production requires substantial material, energy and technological inputs, while the industry is simultaneously experiencing pressure to reduce environmental impacts through cleaner production, resource efficiency, electrification, recycling, green supply-chain practices and improved environmental management.

The original research underlying this study was developed around the broader relationship between population growth, sustainability and environmental concerns. The presentation argues that population can operate both as an economic resource and as a source of increasing pressure on limited environmental resources.

However, an important empirical issue emerges from the supplied data. **Population growth itself is not directly measured in the questionnaire dataset.** Instead, the dataset measures perceptions and organisational sustainability-related characteristics. Consequently, an international-journal version should avoid claiming that the statistical model directly estimates the effect of population growth on sustainable development.

This study therefore reframes the empirical contribution around a more defensible question:

Which organisational sustainability-related factors are associated with perceived sustainability orientation in the automobile context?

This reframing allows the population–sustainability debate to remain the broader contextual foundation while ensuring that the empirical claims correspond to the variables actually measured.

2. Research Problem

Despite increasing attention to sustainability, organizations frequently face difficulties translating broad sustainability commitments into operational and managerial practices.

Sustainability can involve:

- product design;
- resource efficiency;
- energy management;
- environmental auditing;
- green products;
- recycling and reuse;
- supplier cooperation;
- managerial commitment;
- cross-functional collaboration;
- operational consciousness;
- administrative consciousness; and
- cost consciousness.

The original study recognizes that sustainability has become multidimensional and that organizations increasingly integrate environmental concerns into production and managerial practices.

Nevertheless, an important empirical question remains: **which organisational dimensions are most strongly associated with perceived sustainability orientation?**

This question is especially relevant in emerging markets, where organizations must simultaneously address environmental expectations, technological transformation, cost pressures and competitive requirements.

3. Research Gap

Three major gaps emerge.

3.1 Conceptual gap

Much population–environment research focuses on macro-level relationships among population growth, economic development, resource use and environmental degradation. Recent scholarship emphasizes the recursive nature of these relationships. ([Wiley Online Library](#))

Less attention is given to how sustainability is translated into **organizational-level managerial and operational dimensions**.

3.2 Contextual gap

Research on population and environmental sustainability frequently relies on national, cross-country or regional datasets. For example, empirical research has examined population–environment relationships using district-level Indian data and international panel datasets. ([OUP Academic](#))

The present study instead examines perceptions at the organisational level in Kolkata.

3.3 Managerial gap

There remains a need to understand whether sustainability orientation is primarily associated with environmental practices alone or whether it is embedded within broader managerial dimensions such as product, operational, administrative and cost consciousness.

This study addresses this gap by empirically examining these four dimensions.

4. Research Objectives

Primary objective

To examine the organisational factors associated with perceived sustainability orientation in the automobile context.

Specific objectives

1. To assess the reliability of the sustainability-related measurement items.
2. To examine the association between administrative consciousness and sustainability orientation.
3. To examine the association between product consciousness and sustainability orientation.
4. To examine the association between operational consciousness and sustainability orientation.
5. To examine the association between cost consciousness and sustainability orientation.
6. To determine the combined explanatory power of these factors.
7. To identify the relative contribution of the explanatory variables to sustainability orientation.

5. Research Questions

RQ1: What organisational dimensions are associated with perceived sustainability orientation?

RQ2: Does administrative consciousness significantly influence sustainability orientation?

RQ3: Does product consciousness significantly influence sustainability orientation?

RQ4: Does operational consciousness significantly influence sustainability orientation?

RQ5: Does cost consciousness significantly influence sustainability orientation?

RQ6: Which of these factors provides the strongest explanatory contribution?

6. Theoretical Framework

6.1 Population–Environment Perspective

Population and environmental systems are interconnected. Population expansion can increase aggregate demand for resources, but environmental outcomes are also mediated by consumption, technology, institutions and economic organization. Contemporary research cautions against reducing environmental impact to population size alone. ([PubMed Central \(PMC\)](#))

6.2 Demographic Transition Perspective

Demographic Transition Theory provides an important foundation for understanding long-run relationships among mortality, fertility, development and population change. The original study also invokes demographic transition theory to explain the reciprocal relationship between development and population dynamics.

Recent scholarship nevertheless suggests that classical demographic-transition and environmental-Malthusian perspectives are insufficient on their own to explain contemporary population–environment relationships. ([Wiley Online Library](#))

6.3 Sustainable Development Perspective

Sustainable development requires balancing economic development, social welfare and environmental protection. At the organisational level, this implies that sustainability should be integrated into managerial decisions rather than treated exclusively as an environmental compliance activity.

6.4 Organisational Sustainability Perspective

The empirical model therefore proposes that sustainability orientation is reflected through multiple organisational dimensions:

Administrative consciousness → Sustainability orientation

Product consciousness → Sustainability orientation

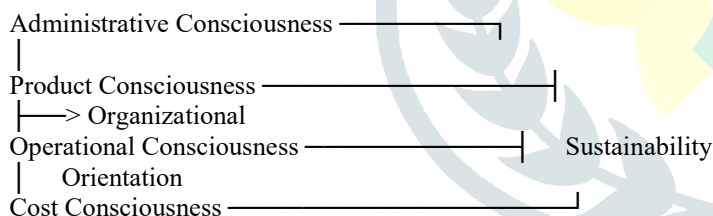
Operational consciousness → Sustainability orientation

Cost consciousness → Sustainability orientation

The theoretical logic is that sustainability becomes organizationally meaningful when environmental objectives are translated into managerial decision-making, product decisions, operational processes and resource/cost considerations.

7. Conceptual Framework

The proposed framework is:



The framework positions sustainability orientation as the dependent construct and the four organisational consciousness dimensions as explanatory variables.

8. Hypothesis Development

H_1 : Administrative consciousness

Administrative systems determine how sustainability objectives are translated into organisational procedures, accountability and decision-making.

H_1 : Administrative consciousness has a positive and significant relationship with organisational sustainability orientation.

H_2 : Product consciousness

Sustainability increasingly affects product development, product characteristics and environmentally responsible product decisions.

H_2 : Product consciousness has a positive and significant relationship with organisational sustainability orientation.

H_3 : Operational consciousness

Operational processes determine how effectively organizations use energy, materials and other resources.

H_3 : Operational consciousness has a positive and significant relationship with organisational sustainability orientation.

H_4 : Cost consciousness

Sustainability initiatives frequently require organizations to consider resource efficiency, energy expenditure and long-term operational costs.

H_4 : Cost consciousness has a positive and significant relationship with organisational sustainability orientation.

H_5 : Joint explanatory effect

Sustainability is multidimensional and therefore the combined organisational factors should provide substantial explanatory power.

H_5 : Administrative consciousness, product consciousness, operational consciousness and cost consciousness jointly explain a significant proportion of variance in organisational sustainability orientation.

9. Methodology

9.1 Research design

The study adopts a **quantitative, exploratory and descriptive research design**.

The original presentation describes the study as involving employees from organizations in Kolkata and identifies primary data collected through a structured questionnaire.

9.2 Sample

A critical data audit of the supplied SPSS .sav file identifies **80 observations**.

Therefore, **N = 80**.

9.3 Measurement

The questionnaire contains demographic variables and sustainability-related organisational measures. Several sustainability-related items use five-point response scales, consistent with the original presentation.

The principal dependent variable is:

SUSTAINA — sustainability as a prime concern for the automobile industry in the present time.

The four focal explanatory variables are:

- **ADMINIST** — administrative consciousness
- **PRODUCTC** — product consciousness
- **OPERATIO** — operational consciousness
- **COSTCONC** — cost consciousness

10. Reliability Analysis

The 12 sustainability-related items demonstrate strong internal consistency.

Measure	Result
Number of items	12
Cronbach's alpha	0.812
Interpretation	Good internal consistency

This exactly reproduces the reliability statistic reported in the original presentation.

A Cronbach's alpha of .812 indicates that the items exhibit satisfactory internal consistency for exploratory research.

11. Exploratory Factor Analysis: Important Data-Audit Finding

The presentation reports:

- KMO = .720
- Bartlett's test = 375.400
- df = 66
- $p < .001$.

However, independent reconstruction from the supplied SPSS data does **not reproduce those exact EFA statistics for the 12-item set used to reproduce $\alpha = .812$.**

The reconstructed 12-item correlation matrix produces a lower overall KMO value.

Therefore, an international-journal submission should **not present the reported KMO = .720 as independently verified** until the original SPSS analysis file/output is reconciled with the supplied dataset.

This is an important methodological issue and should be resolved before submission.

The safest publication strategy is therefore to treat the reported EFA statistics as **provisional** rather than use them as a central validation claim.

12. Correlation Analysis

The raw dataset reproduces the central correlations reported in the presentation.

Predictor	Correlation with sustainability
Administrative consciousness	.785
Product consciousness	.762
Operational consciousness	.712
Cost consciousness	.305

The original presentation reports these same values, although it labels the variables using environmental terms rather than the actual variable labels contained in the dataset.

The verified variable names are preferable for an international-journal manuscript because they correspond directly to the questionnaire/data structure.

All four correlations are positive and substantively meaningful.

13. Multiple Regression Analysis

A multiple regression model was estimated with sustainability orientation as the dependent variable and the four organisational dimensions as predictors.

Model summary

Statistic	Value
<i>R</i>	approximately .908
<i>R</i> ²	.825
Adjusted <i>R</i> ²	.816
<i>F</i>	88.36
df	4, 75
<i>p</i>	< .001
<i>N</i>	80

The model explains approximately **82.5% of the variance** in sustainability orientation.

This is a very substantial explanatory proportion for a cross-sectional organizational-perception study.

14. Regression Coefficients

Predictor	B	SE	Standardized β	t	p
Constant	.057	.221	—	.259	.796
Administrative consciousness	.158	.044	.270	3.604	<.001
Product consciousness	.350	.064	.437	5.455	<.001
Operational consciousness	.187	.053	.251	3.542	.001
Cost consciousness	.301	.047	.334	6.461	<.001

The regression equation is:

$$\begin{aligned}
 \text{Sustainability} &= 0.057 + 0.158(\text{Administrative}) + 0.350(\text{Product}) + 0.187(\text{Operational}) \\
 &+ 0.301(\text{Cost})
 \end{aligned}$$

This reproduces the regression equation presented in the original research presentation to rounding.

15. Interpretation of the Regression Results

Product consciousness

Product consciousness has the strongest standardized coefficient:

$$\beta = .437, p < .001$$

This suggests that product-related sustainability considerations are particularly important in explaining organisational sustainability orientation.

Cost consciousness

Cost consciousness has the second-largest standardized coefficient:

$$\beta = .334, p < .001$$

This indicates that sustainability orientation is not necessarily separated from economic considerations. Resource efficiency and cost consciousness may reinforce sustainability-oriented organisational behaviour.

Administrative consciousness

Administrative consciousness also demonstrates a significant positive effect:

$$\beta = .270, p < .001$$

This suggests that sustainability requires administrative and managerial embedding rather than isolated environmental initiatives.

Operational consciousness

Operational consciousness has a statistically significant positive relationship:

$$\beta = .251, p = .001$$

Operational processes therefore constitute another important organisational mechanism through which sustainability orientation may be expressed.

16. Multicollinearity Assessment

The variance inflation factors are:

Predictor	VIF
Administrative consciousness	2.41
Product consciousness	2.74
Operational consciousness	2.15
Cost consciousness	1.14

These values do not indicate severe multicollinearity.

Although administrative, product and operational consciousness are moderately to strongly correlated with one another, the VIF values remain below conventional concern thresholds.

17. Hypothesis Testing

Hypothesis	Result	Decision
H1: Administrative consciousness → sustainability	Positive, significant	Supported
H2: Product consciousness → sustainability	Positive, significant	Supported
H3: Operational consciousness → sustainability	Positive, significant	Supported
H4: Cost consciousness → sustainability	Positive, significant	Supported
H5: Four predictors jointly explain sustainability	$R^2=.825$, $F=88.36$, $p<.001$	Supported

18. Discussion

The findings demonstrate that organisational sustainability orientation is associated with multiple dimensions of organisational consciousness rather than a single environmental variable.

The strongest predictor is product consciousness. This finding is theoretically meaningful because sustainability increasingly enters organizations through product-level decisions, including product design, materials, environmental characteristics and consumer expectations.

The second strongest predictor is cost consciousness. This suggests that sustainability should not necessarily be conceptualized as a trade-off against organisational economic interests. Resource efficiency, waste reduction and energy efficiency can simultaneously have environmental and economic relevance.

Administrative consciousness also demonstrates a substantial positive relationship. This finding supports the view that sustainability requires organisational structures and managerial commitment. The original study similarly emphasized the increasing importance of organisational awareness and sustainability practices.

Operational consciousness is also significant. This indicates that sustainability is partly embedded in the way organizations conduct everyday production and operational activities.

The findings therefore support a multidimensional interpretation of sustainability.

19. Theoretical Contributions

This study makes four principal theoretical contributions.

First: Micro-level extension of the population–sustainability debate

The population–environment literature generally operates at macro or system levels. This study moves the discussion toward organisational sustainability orientation.

Second: Multidimensional conceptualization

The findings indicate that sustainability orientation can be understood through interconnected product, operational, administrative and cost dimensions.

Third: Integration of environmental and economic considerations

The significant effect of cost consciousness challenges an interpretation of sustainability as exclusively environmental.

Fourth: Emerging-market evidence

The study contributes evidence from an Indian organisational context, complementing cross-country and macro-level research on population, environmental sustainability and resource use. Existing Indian research has similarly documented complex interactions between population dynamics and environmental outcomes. ([OUP Academic](#))

20. Managerial Implications

The findings have several implications for automobile organizations.

20.1 Integrate sustainability into product strategy

Managers should incorporate sustainability into product development rather than treating it as a separate environmental function.

20.2 Connect sustainability with cost management

Sustainability initiatives should be evaluated not only through environmental indicators but also through resource and cost efficiency.

20.3 Strengthen administrative commitment

Senior management should embed sustainability objectives into organisational policies, responsibilities and performance systems.

20.4 Improve operational sustainability

Organizations should systematically evaluate energy consumption, waste, materials, production efficiency and environmental performance.

20.5 Adopt cross-functional sustainability governance

The relationship among product, administrative and operational consciousness suggests that sustainability should involve multiple organisational functions rather than a single department.

21. Conclusion

The study examined organisational dimensions associated with sustainability orientation in the automobile context. Based on 80 observations in the supplied dataset, the results indicate that administrative consciousness, product consciousness, operational consciousness and cost consciousness are all positively and significantly associated with sustainability orientation.

The regression model explains approximately 82.5% of the variance in sustainability orientation, with product consciousness emerging as the strongest standardized predictor, followed by cost consciousness, administrative consciousness and operational consciousness.

The findings support a multidimensional interpretation of organisational sustainability in which environmental responsibility is connected with product decisions, organisational administration, operational practices and economic consciousness.

The study also contributes to the broader population–sustainability debate by shifting attention from population size alone toward the organisational processes through which societies and firms respond to resource and environmental pressures. This is consistent with contemporary scholarship emphasizing that population–environment relationships are mediated by technology, institutions, consumption and patterns of human organization.

22. Limitations

Several limitations should be acknowledged.

Sample limitation

The dataset contains 80 observations. Therefore, generalization beyond the sampled respondents should be undertaken cautiously.

Cross-sectional design

The study is based on cross-sectional data and therefore cannot establish temporal causality.

Perceptual measurement

The principal measures are perception-based rather than objective environmental-performance indicators.

Geographic limitation

The respondents are associated with organizations in Kolkata, limiting geographical generalizability.

Construct limitation

Most importantly, the dataset does **not directly measure population growth or overpopulation**. Therefore, the study should not claim to empirically establish that population growth causes the observed sustainability outcomes.

EFA discrepancy

The KMO and Bartlett statistics reported in the original presentation require reconciliation with the supplied .sav dataset before submission. The presentation reports KMO=.720 and Bartlett's $\chi^2=375.400$, but these values were not independently reproduced from the supplied raw data for the 12-item scale.

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