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Validating the Theory of Planned Behavior in Sustainability and Analyzing Gender and Regional Disparities

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ABSTRACT:
This study investigates the applicability of the Theory of Planned Behavior (TPB) in analyzing sustainable behavior and examines gender-based disparities and regional disparities in sustainability practices. Using survey data from six Indian states, the paper validates TPB's effectiveness in predicting sustainable behavior by analyzing attitudes, perceived behavioral control, subjective norms, and behavioral intentions. Additionally, the paper explores gender differences by quantifying responses to key sustainability-related decisions, revealing that males are more inclined toward financial sustainability investments, while females demonstrate stronger engagement in household-level sustainable practices. Furthermore, the regional analysis highlights that respondents from Odisha and Bihar exhibit greater adherence to sustainable practices, likely due to cultural upbringing and early childhood teachings. By combining statistical validation of TPB with numerical scoring for gender and regional disparities, this study provides actionable insights for policymakers and sustainability advocates.

Keywords: Theory of planned behavior (TPB), Sustainable practices, Regional-disparity, Gender-Disparity

1. Introduction

Sustainability is a growing concern in today's world, especially in fast-developing nations like India. With increasing urbanization, population growth, and limited resources, ensuring sustainable practices is more critical than ever. The United Nations' Sustainable Development Goals (SDGs) stress the importance of both policy-driven actions and behavioral shifts at individual and societal levels (United Nations, 2015). However, the deeper psychological and social motivations behind sustainable decision-making remain an area that requires further exploration, particularly in a diverse country like India.
One of the key frameworks used to study human behavior in sustainability is the Theory of Planned Behavior (TPB). This theory suggests that a person's intention to engage in behavior is shaped by three main factors: personal attitudes (what they believe and value), subjective norms (social and cultural influences), and perceived behavioral control (their

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confidence in carrying out the behavior) (Laheri et al., 2024). While TPB has been widely used in environmental psychology, its application in sustainability research often lacks depth, failing to consider differences across demographics and regions (Ajzen, 2020). Most studies on sustainability focus on economic and environmental aspects but do not take gender and regional factors into account (Steg & Vlek, 2008; Gifford & Nilsson, 2014). Research indicates that men tend to engage more in sustainability efforts related to industries and economic policies, whereas women are more likely to adopt sustainable habits in their daily lives, such as household management and consumption choices (Zelezny et al., 2000). These tendencies are shaped by cultural expectations, access to resources, and societal roles. For instance, in many Indian communities, cultural norms associate environmental responsibility within the household with women, which increases subjective norms supporting sustainable behavior among them. Similarly, men may feel less social pressure to adopt such behaviors due to different cultural expectations around their roles. Furthermore, perceived behavioral control can be affected by these expectations—for example, women in rural areas may face constraints in mobility or decision-making autonomy, lowering their perceived ability to engage in broader sustainability practices. However, more empirical research is needed to validate these claims (Xiao & McCright, 2013).

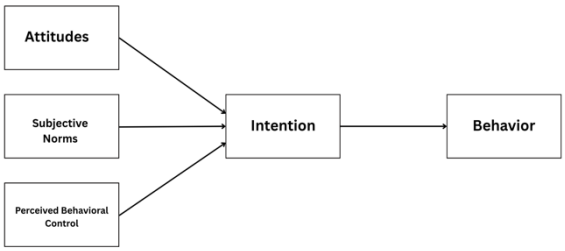

Fig 1: Theory of Planned Behavior

Figure 1 illustrates the TPB model, which guided the development of our survey and interpretation of findings. In this study, attitudes, subjective norms, and perceived behavioral control were adapted to sustainability contexts relevant to Indian communities. These components are interrelated, cultural expectations shape subjective norms, which in turn influence perceived behavioral control. For instance, women in rural regions may experience stronger normative pressure to act sustainably but limited control due to social or resource constraints. Such dynamics ultimately affect their behavioral intentions, highlighting the need to examine TPB through a cultural and demographic lens. Regional differences also play a crucial role in shaping sustainability practices. Studies show that in states like Odisha and Bihar, where communities rely heavily on traditional practices and necessity-driven conservation, sustainability commitments tend to be stronger (Kaur et al., 2022). On the other hand, in highly industrialized urban areas, sustainability efforts tend to be driven more by regulations and policies rather than voluntary community participation (Moser & Dilling, 2011). These contrasts suggest that both subjective norms and perceived behavioral control may vary by region, depending on local cultural

values and institutional structures. Given these contrasts, it is important to analyze sustainability behaviors from a more localized perspective. This study aims to fill these gaps by examining how gender and regional factors influence sustainable behavior. Using survey data from six Indian states—Bihar, Odisha, Maharashtra, Uttar Pradesh, Haryana, and Delhi—this research evaluates the effectiveness of TPB in predicting sustainability-related decisions.

1.1 Research Objectives:

- Assess TPB's validity**:** Test how well TPB explains sustainable behavior in different demographics.
- Understand gender-based differences**:** Compare how men and women approach sustainability-related decisions.
- Explore regional influences**:** Analyze the role of cultural and economic backgrounds in shaping sustainability choices.

By combining behavioral science with real-world data, this research aims to provide practical insights for policymakers, sustainability advocates, and urban planners. Understanding what drives people to make sustainable choices can help design better educational programs, policies, and interventions that encourage long-term sustainability efforts at both the individual and institutional levels.

2. Theoretical Background

Many studies have explored sustainability through the lens of the Theory of Planned Behavior (TPB), showing how different personal and societal factors influence people's decisions. This section reviews key research on how TPB has been applied to sustainability, as well as the role gender and regional differences play in shaping sustainable behaviors.

2.1. TPB and Sustainable Behavior

Ajzen's Theory of Planned Behavior (1991) is one of the most widely used models to study human decision-making (Ajzen, 1991). It suggests that attitudes, social pressures, and perceived control all play a role in shaping intentions and behaviors. Research has found that TPB is useful for predicting environmentally friendly behaviors. For example, Conner and Armitage (1998) showed that individuals with positive attitudes toward sustainability and a belief in their ability to effect change are more likely to adopt sustainable practices, a finding supported by more recent research as well (García-Salirrosas et al., 2024).

2.2. Gender-Based Differences in Sustainability Practices

Gender plays a significant role in how people engage with sustainability. Studies suggest that women tend to be more concerned about environmental issues and are more likely to adopt sustainable habits at home, such as reducing waste and conserving energy. On the other hand, men are often more focused on sustainability in business and economic contexts, such as investing in green technologies (Kennedy & Kmec, 2018). These differences are influenced by cultural roles and socialization, which shape people's decision-making processes. Understanding these patterns can help create more effective policies and sustainability programs tailored to different groups.

2.3. Regional Disparities and Cultural Influences

Geographical differences have a big impact on the adoption of sustainable practices. Cultural heritage, traditional ecological knowledge, and socio-economic differences contribute to the way people view and engage with sustainability ideas (Gertler, 1993). Traditional societies are likely to embrace sustainable practices, but others might require specific interventions to trigger behavioral change. It is necessary to consider these global and cultural differences when developing effective sustainability programs since context-based interventions are likely to engage people more than generic, one-size-fits-all interventions.

More recent studies have started using statistical models to better understand how TPB applies to sustainability. Researchers are looking at how demographic factors, such as gender and location, interact with TPB principles to influence sustainable behavior. By combining survey data with statistical analysis, these studies provide valuable insights that help policymakers and sustainability advocates create more targeted and effective initiatives. Overall, the existing research confirms that TPB is a useful framework for understanding sustainable behavior. However, considering additional factors like gender and regional differences makes it even more effective in explaining why people make certain sustainability choices. This study builds on these insights to provide a deeper analysis of how sustainability behaviors vary across different demographic groups.

3. Methods

3.1. Instrument

This study assesses the validation of the Theory of Planned Behavior (TPB) in sustainability contexts and analyzes gender and regional disparities across Indian states. The TPB constructs proposed by Ajzen (1991) were taken into consideration, which were adapted to focus on sustainability behaviors. The study focused on analyzing different dimensions of TPB as they relate to sustainability intentions and behaviors, with particular attention to gender differences and regional variations across six Indian states. The scales to measure constructs of the study were adopted from previous studies in similar fields. Every construct was measured on a five-point Likert scale ranging from strongly disagree (=1) to strongly agree (=5). The constructs used in the study were determinants of sustainability behavior according to TPB (attitude, subjective norms, perceived behavioral control, intentions, and behavior). Additionally, demographic information was collected to enable analysis of gender and regional disparities. To understand what influences sustainable behavior, this study used well-established tools to measure key factors: personal attitudes (Henerson et al., 1978), social norms around sustainability (Setyo et al., 2024), perceived control over sustainable actions (Ajzen, 2002), sustainability intentions (Romero-Colmenares & Reyes-Rodríguez, 2022), and actual sustainable behaviors (Martin & Bateson, 2000).

3.2. Data Collection and Sample Design

This study gathered data from six Indian states, ensuring diverse cultural and socio-economic perspectives. The data collection process involved the following steps:

- Sampling Method: A stratified sampling approach was used to ensure balanced representation from each state. This method helped capture regional differences and included a mix of demographic groups.

- Survey Administration: To maximize participation, surveys were conducted both online and through in-person interactions. This dual approach helped reach a broader audience and minimized biases associated with a single method.

- Pilot Testing: Before launching the full survey, a small pilot test was conducted. Feedback from this test was used to refine the survey questions, improve clarity, and ensure that gender-specific and regional aspects were accurately addressed.

- Response Rate and Data Quality Control: To maintain high data quality, responses were checked for completeness and consistency. Statistical reliability tests, such as Cronbach's alpha (1951), were later applied to ensure the accuracy and dependability of the collected data.

3.3. Data Analysis

The analysis followed a structured, multi-stage approach to address the study's core research questions:

3.3.1 Validating TPB in a Sustainability Context

- To ensure the Theory of Planned Behavior (TPB) was a reliable framework for studying sustainability, we first conducted a reliability analysis using Cronbach's alpha. This helped confirm that the key TPB factors—attitude, subjective norms, perceived control, intentions, and behavior—were measured consistently.
- A correlation analysis was then performed to examine how these factors were related. This step validated whether the expected relationships within TPB held true in the context of sustainability.
- Finally, regression analysis was used to determine how well TPB factors predicted sustainable behavior. This allowed us to assess the strength of influence from attitudes, norms, and perceived control on both sustainability intentions and real-life actions.

3.3.2 Gender-Based Differences in Sustainable Practices

- To explore how gender influences sustainable behavior, we categorized sustainability actions into two main groups:
  - Financial Decision-Related Behaviors, such as investing in eco-friendly products, willingness to pay extra for sustainability, and supporting renewable energy initiatives.
  - Household Management-Related Behaviors, including waste segregation, water conservation, energy efficiency, and sustainable food choices.
- First, descriptive statistics (like averages and standard deviations) were used to compare engagement levels between men and women.

- Then, a comparative analysis examined whether gender differences in sustainability behaviors were significant, shedding light on how men and women approach sustainability differently.

3.3.3 Regional Disparities in Sustainable Practices

- We analyzed sustainability engagement across six Indian states: Delhi, Maharashtra, Haryana, Uttar Pradesh, Bihar, and Odisha.
- First, regional averages were calculated to compare sustainability scores across these states, giving a clear picture of regional sustainability trends.
- Next, an urbanization classification was applied using government data to rank regions based on their level of urbanization. This helped examine whether urbanized areas had distinct sustainability patterns compared to rural ones.
- Finally, a motivational analysis looked at whether sustainable behaviors were driven by personal values and environmental beliefs (internal factors) or by external influences like social norms, infrastructure, and policy enforcement.

By combining these analytical techniques, the study provided a well-rounded view of how sustainability behaviors vary based on psychological, gender-based, and regional factors. These findings help inform more targeted sustainability policies and interventions.

3.4. Sample Demographics

The demographic profile of the respondents was categorized into several key variables, including age, income, gender, occupation, education level, and region, ensuring a well-distributed sample for meaningful analysis. The study was designed to maintain gender balance, with equal representation of males (50%) and females (50%) among the 180 respondents. The age distribution of the respondents varied, with the largest group (33.33%) falling within the 20-25 years category, followed by 26-35 years (16.1%), 46-55 years (22.8%), and smaller proportions in the younger (< 20 years) and older (>55 years) age groups. Regarding educational qualifications, the majority of respondents were graduates (53.9%), followed by postgraduates (29.4%), while a smaller proportion had primary/secondary education (13.9%) or qualifications above the postgraduate level (2.8%). The occupational distribution varied across sectors, reflecting a mix of professionals, self-employed individuals, students, and others. Similarly, income levels were diverse, with 33.9% of respondents earning between ₹20,000-50,000 per month, followed by 26.1% in the ₹50,000-100,000 range and 25.6% earning more than ₹100,000 per month. To ensure a geographically diverse representation, the study included 30 respondents from each of the six Indian states—Delhi, Maharashtra, Haryana, Uttar Pradesh, Bihar, and Odisha. This regional distribution allows for a comparative analysis of sustainable behaviors across different urbanization levels and cultural contexts. The demographic segmentation provides a strong foundation for understanding variations in sustainability engagement across different societal groups.

4. Results and Discussion

4.1. Validation of Theory of Planned Behavior in Sustainability Context

4.1.1 Reliability Analysis

The internal consistency of the Theory of Planned Behavior (TPB) constructs was evaluated using Cronbach's alpha. All constructs demonstrated acceptable to excellent reliability ($\alpha = 0.78$-0.91), exceeding the recommended threshold of 0.70 (Table 1). This confirms the measurement instruments' reliability in assessing the TPB constructs within the sustainability context.

Table 1: Reliability Analysis of TPB Constructs

Constructs	**Cronbach's Alpha**	**Reliability Level**
Attitude toward Sustainability	0.89	Good
Subjective Norms	0.81	Good
Perceived Behavioral Control	0.78	Acceptable
Sustainability Intentions	0.85	Good
Sustainable Behavior	0.91	Excellent

4.1.2 Correlation Analysis

Bivariate correlations between TPB constructs revealed significant positive relationships, aligning with theoretical expectations (Table 2). The strongest correlation was observed between sustainability intentions and sustainable behavior ($r = 0.74$, $p < 0.001$), supporting the TPB premise that intentions are the most proximal predictor of behavior. Additionally, moderate to strong correlations were found between attitude toward sustainability and intentions ($r = 0.63$, $p < 0.01$), subjective norms and intentions ($r = 0.58$, $p < 0.01$), and perceived behavioral control and intentions ($r = 0.61$, $p < 0.01$).

Table 2: Correlation Matrix of TPB Constructs

Constructs	**Attitude toward Sustainability**	**Subjective Norms**	**Perceived Behavioral Control**	**Sustainability Intentions**	**Sustainable Behavior**
Attitude toward Sustainability	1.00				
Subjective Norms	0.52**	1.00			

Perceived Behavioral Control	0.48**	0.45**	1.00		
Sustainability Intentions	0.63**	0.58**	0.61**	1.00	
Sustainable Behavior	0.56**	0.49**	0.57**	0.74**	1.00
***p<0.01*					

4.1.3 Regression Analysis

Multiple regression analysis confirmed the predictive power of TPB components. Attitude toward sustainability ($\beta = 0.37$, $p < 0.01$), subjective norms ($\beta = 0.29$, $p < 0.01$), and perceived behavioral control ($\beta = 0.34$, $p < 0.01$) collectively explained 62% of the variance in sustainability intentions ($R^2 = 0.62$, $F(3, 176) = 95.68$, $p < 0.01$). Furthermore, intentions significantly predicted sustainable behavior ($\beta = 0.74$, $p < 0.01$), explaining 55% of its variance ($R^2 = 0.55$, $F(1, 178) = 214.62$, $p < 0.01$). These results provide strong empirical support for the applicability of TPB in understanding sustainable behavior.

Table 3: Regression Analysis Results and Relative Strength of TPB Predictors

Dependent Variable: Sustainability Intentions	***β***	***t***	***p***
Attitude	0.37	5.89	<0.01
Subjective Norms	0.29	4.62	<0.01
Perceived Behavioral Control	0.34	5.41	<0.01
$R^2 = 0.62$, $F(3, 176) = 95.68$, $p < 0.01$			

Dependent Variable: Sustainable Behavior	***β***	***t***	***p***
Intentions	0.74	14.65	<0.01
$R^2 = 0.55$, $F(1, 178) = 214.62$, $p < 0.01$			

The regression results highlight the relative influence of the TPB constructs on sustainability intentions. Among the three predictors, **attitude toward sustainability ($\beta = 0.37$)** exhibited the strongest influence, followed by **perceived behavioral control ($\beta = 0.34$)** and **subjective norms ($\beta = 0.29$)**. These findings suggest that shaping positive

attitudes may be the most effective pathway for influencing sustainability intentions in the overall sample.

4.2. Gender Disparities in Sustainable Behaviors

4.2.1 Gendered Patterns in Sustainable Practices

Analysis of gender differences revealed distinct patterns in sustainable behaviors across financial decision-related and household management-related domains (Table 4). Males demonstrated significantly higher engagement in financial decision-related sustainable behaviors (M = 3.85, SD = 0.72) compared to females (M = 3.21, SD = 0.82), with a mean difference of 0.64. The largest gender gap was observed in renewable energy investments (mean difference = 0.77).

Conversely, females exhibited stronger engagement in household management-related sustainable behaviors (M = 4.19, SD = 0.70) compared to males (M = 3.42, SD = 0.84), with a mean difference of -0.77. The most pronounced differences were observed in water conservation (mean difference = -0.86) and waste segregation (mean difference = -0.84).

Table 4: Mean Scores of Sustainable Behaviors by Gender

Behavior Type	**Male (n=90)**	**Female (n=90)**	**Mean Difference**
Financial Decision-Related			
Investment in sustainable products	3.87	3.28	0.59
Willingness to pay premium for eco-friendly options	3.76	3.21	0.55
Renewable energy investments	3.92	3.15	0.77
Overall Financial Decision Score	**3.85**	**3.21**	**0.64**
Household Management-Related			
Waste segregation	3.38	4.22	-0.84
Water conservation	3.45	4.31	-0.86
Energy-saving practices	3.56	4.18	-0.62
Sustainable food choices	3.29	4.05	-0.76
Overall Household Management Score	**3.42**	**4.19**	**-0.77**

4.2.2 Gender-Based Comparative Analysis

The results indicate a clear gender-based pattern in sustainable behaviors. Males scored significantly higher in financial decision-related sustainable behaviors 54.5% compared to females 45.5%. Conversely, females demonstrated stronger engagement in household management-related sustainable behaviors 55.1% compared to males 44.9%. These findings suggest that gender roles and societal expectations may influence the domains in which individuals practice sustainability. Males appear more engaged in financial sustainability decisions, while females show greater involvement in daily household sustainability practices.

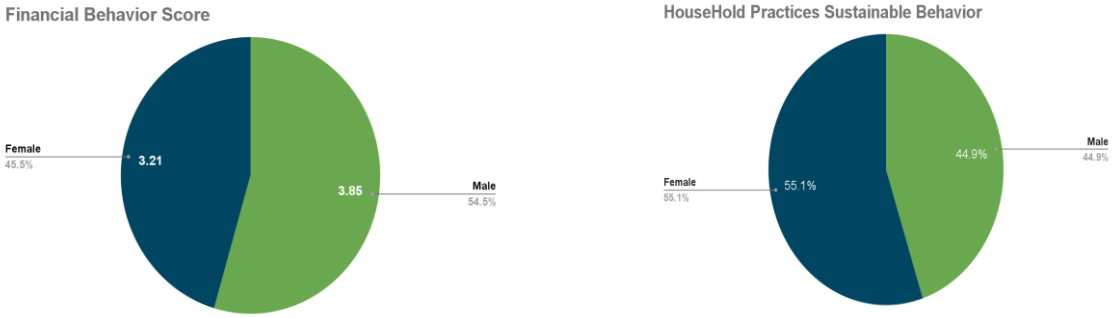

Figure 2: Financial Behavior Score vs Household Practices Behavior Score

4.3. Regional Disparities in Sustainable Practices

The analysis of regional sustainability practices revealed a counterintuitive relationship between urbanization and sustainable behaviors, as shown in Table 5 and the accompanying graph depicting the relationship between sustainability scores and cultural traditional influence. Contrary to initial expectations, regions with lower urbanization but stronger traditional cultural values demonstrated higher overall sustainability scores. Odisha, the least urbanized region, recorded the highest sustainability score ($M = 4.37$, $SD = 0.58$), followed by Bihar ($M = 4.25$, $SD = 0.61$), while Delhi, the most urbanized region, had the lowest sustainability engagement score ($M = 3.52$, $SD = 0.85$). This trend was evident across both financial decision-related and household management-related behaviors, with the effect being more pronounced in household management practices. Regions with very strong cultural influences, such as Odisha, exhibited particularly high household sustainability scores ($M = 4.62$, $SD = 0.52$), suggesting that traditional community-driven sustainability approaches—such as resource-sharing, waste minimization, and collective resource management—are more effective than the individualistic sustainability models seen in urbanized areas.

Table 5: Regional Comparison of Sustainable Practices by Cultural Heritage and Urbanization

Region	Cultural Tradition Influence	Urbanization Rank	Overall Sustainability Score	Financial Decision Score	Household Management Score	Driving Factor
Odisha	Very Strong	6 (Lowest)	4.37 (0.58)	4.12 (0.63)	4.62 (0.52)	External Factor Score >Internal Factor Score
Bihar	Strong	5	4.25 (0.61)	4.07 (0.67)	4.43 (0.55)	External Factor Score >Internal Factor Score
Uttar Pradesh	Moderate	4	3.96 (0.73)	3.88 (0.75)	4.04 (0.71)	External Factor Score > Internal Factor Score
Haryana	Mixed	3	3.71 (0.78)	3.65 (0.81)	3.77 (0.75)	Internal Factor Score > External Factor Score
Maharashtra	Low	2	3.65 (0.79)	3.58 (0.82)	3.72 (0.76)	Internal Factor Score > External Factor Score
Delhi	Very Low	1 (Highest)	3.52 (0.85)	3.45 (0.89)	3.59 (0.81)	Internal Factor Score > External Factor Score

The findings indicate that external cultural values play a more significant role in driving sustainability in less urbanized regions, whereas in highly urbanized areas like Delhi and Maharashtra, sustainability engagement relies more on individual motivations but remains lower overall. The graph further illustrates that as cultural traditional influence strengthens, sustainability scores increase, reinforcing the idea that indigenous knowledge and intergenerational sustainability practices serve as powerful motivators for sustainable behavior. This challenges the assumption that urbanization inherently enhances sustainability and highlights the importance of integrating traditional wisdom with modern sustainability policies. These insights suggest that development strategies should not only focus on infrastructure-driven solutions but also leverage cultural heritage to foster sustainable behaviors, particularly in urban settings where external cultural influence is weaker.

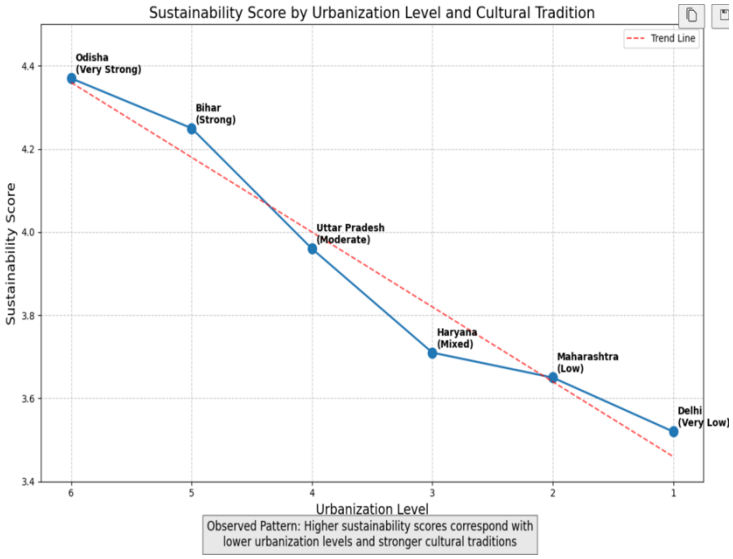

Figure 3: Sustainability score by urbanization level and cultural tradition.

5. Implications and further research

This study quantitatively validates the Theory of Planned Behavior (TPB) in predicting sustainable behaviors, with TPB constructs explaining 62% of the variance in sustainability intentions ($R^2 = 0.62$, $p < 0.01$) and intentions accounting for 55% of the variance in sustainable behavior ($R^2 = 0.55$, $p < 0.01$). Gender-based analysis revealed that males scored higher in financial decision-related sustainability (54.5%) compared to females (45.5%), while females exhibited greater engagement in household sustainability (55.1%) than males (44.9%). Regional disparities showed that Odisha, with the highest cultural influence, recorded the highest sustainability score ($M = 4.37$, $SD = 0.58$), while Delhi, the most urbanized region, had the lowest ($M = 3.52$, $SD = 0.85$). The correlation between cultural traditional influence and sustainability scores suggests that external cultural values play a crucial role in less urbanized regions, whereas urban sustainability relies more on individual motivation. The strong positive relationship between sustainability intentions and behavior ($r = 0.74$, $p < 0.001$) reinforces the importance of behavioral intent in driving sustainable actions. These findings challenge the assumption that urbanization inherently enhances sustainability and highlight the need for development strategies that integrate cultural heritage, gender-specific interventions, and regional adaptations to foster sustainable practices effectively.

These findings contribute meaningfully to the existing literature on behavioral predictors of sustainability by addressing critical gaps related to the influence of gender roles and regional-cultural diversity factors often underexplored in previous research. While earlier studies have provided valuable insights into the personal and social drivers of pro-environmental behavior, many have predominantly emphasized economic and environmental dimensions, with limited attention to how cultural and gendered dynamics influence sustainable practices (Steg & Vlek, 2008; Gifford & Nilsson, 2014). This study overcomes these limitations by empirically demonstrating how both gender and regional

cultural heritage significantly shape sustainability intentions and behaviors. The observed gender differences, where males were more active in financial decision-based sustainability and females in household-level practices extend the findings of Zelezny et al. (Zelezny et al., 2000), who identified that women tend to engage more in everyday sustainable behaviors. Furthermore, the identification of regional disparities in sustainability, particularly the higher scores in culturally rooted but less urbanized regions, underscores that sustainable behavior is context-dependent and deeply embedded in cultural traditions, an area not adequately emphasized in much of the prior literature. These insights not only broaden the theoretical scope of sustainability research but also underscore the necessity of incorporating cultural heritage and gender-responsive strategies into the development of effective, contextually grounded sustainability interventions.The integration of traditional knowledge into urban sustainability frameworks should therefore move beyond symbolic acknowledgment to practical implementation. Policymakers must develop inclusive strategies that embed traditional ecological wisdom into planning and governance by involving local communities, tribal leaders, and cultural custodians in participatory decision-making processes. In summary, this study not only validates the TPB as a predictive model for sustainable behavior but also illuminates the critical role of gender, regional variation, and cultural heritage in shaping sustainability outcomes. To translate these insights into practice, sustainability efforts must be grounded in culturally sensitive policies and education frameworks that actively integrate traditional knowledge. Doing so will enable a more inclusive, resilient, and contextually relevant approach to achieving sustainability, especially in the rapidly urbanizing yet culturally rich landscapes of developing nations.

This study opens several avenues for future research. One of the key areas to explore is the use of a longitudinal design to track behavioral changes over time. The current cross-sectional approach limits our ability to examine whether behavioral intentions lead to sustained actions. A longitudinal framework would provide deeper insights into the temporal dynamics of the Theory of Planned Behavior (TPB) constructs, especially regarding the stability and evolution of intentions and actual behavior over extended periods. Additionally, future studies should aim to enhance geographic and cultural representation. Data in this study were collected from six Indian states, which may not fully reflect the country's vast sociocultural diversity. Including underrepresented and culturally distinct regions, such as tribal areas and Northeast India, could reveal unique behavioral determinants and test the generalizability of TPB across diverse populations.

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