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DIGITAL NUDGING: AN ANALYSIS OF E-COMMERCE UI/UX IN SHAPING GREEN CONSUMER DECISIONS

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ABSTRACT: ***With the unprecedented growth in the field of the E commerce we have seen the revolutionary development of the UI/UX which has immensely affected the customer decisions and market trends in the past decade. Through a 100% survey and insights from behavioural economics, the study shows that people's attitude does not usually match their actions. Although most of the respondents wanted to contribute positively towards environmental reforms, most of them refused to pay extra upfront or hidden charges for the same. And they preferred going by reviews, discounts, peer signals to make their decisions in such E Commerce platforms. When it comes to encouraging greener choices making, making eco-friendly options the default works best (38%). People where strongly influenced by what others around them were doing (88%). Tracking personal impact helped keeping people engaged too. This rapid growth has brought unseen challenges into the market where not only the customer decisions, but the UI & UX interventions guide the customers into making sustainable choices on their purchases. This research aims to shed light on the behavioural economics of consumers making sustainable choices in their day-to-day purchases through E-Commerce platforms. Keywords: Digital nudging, green consumer behaviour, sustainable e-commerce, UI/UX design, behavioural economics, eco-friendly defaults, peer influence, customer decision-making, environmental sustainability, online shopping patterns.***

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1. INTRODUCTION

E-commerce has grown at an astonishing pace. In 2024, global retail sales touched USD 6.3 trillion, and by 2025 they're expected to cross USD 7 trillion nearly a quarter of all retail sales worldwide (Masfer & Helmi, 2025). That growth has made life easier for millions of shoppers, but it has also come with a cost. More packaging, heavier logistics, and rising carbon emissions are proving hard to ignore (Mirbabaie et al., 2023). In India, the shift toward sustainability is becoming serious. Big players like Amazon, Flipkart, and BigBasket are betting on electric vehicles (EVs) to reduce last-mile emissions. Flipkart now delivers more than 70% of its groceries through EVs. BigBasket has doubled its scooter fleet. Amazon India even rolled out 10,000 EVs by late 2024 well ahead of schedule.

These moves don't just cut carbon footprints; they also appeal to eco-conscious buyers and give companies an edge. Yet, the reality is sobering while many shoppers talk about supporting sustainability, only about 14% actually buy eco-friendly products. That's where smart UI/UX design could make all the difference turning good intentions into real action.

2. OBJECTIVES OF THE STUDY

- To examine how digital nudging through UI/UX influences green consumer decision-making in e-commerce.
- To analyze user awareness and response to sustainable design interventions in online shopping platforms.

3. STATEMENT OF THE PROBLEM

The rapid growth of e-commerce has amplified environmental concerns, with packaging waste, carbon-intensive logistics, and increased consumption contributing to climate change. While companies are adopting sustainable practices such as EV-based deliveries and renewable energy solutions, the consumer-facing digital layer remains underutilized in driving green behaviour (Basu & Sarkar, 2025). Although most consumers express willingness to support sustainability, actual purchase decisions often Favor convenience and price over eco-friendly options, highlighting a critical intention-action gap.

Digital nudging offers a strategic solution by embedding behavioural prompts within UI/UX design to encourage sustainable choices without compromising consumer autonomy (Michels et al., 2022). However, the effectiveness of such interventions in diverse cultural and economic contexts remains unclear. Current literature provides limited insights into how personalized nudges, ethical considerations, and interface simplicity collectively shape green consumer behaviour. This study seeks to address these limitations by analysing how UI/UX-based nudging strategies can influence environmentally conscious purchasing in Indian e-commerce platforms.

4. RESEARCH METHODOLOGY & LITERATURE ON DIGITAL NUDGING

The literature on digital nudging in e-commerce emphasizes its potential to guide consumers toward environmentally responsible decisions. This section synthesizes empirical findings and conceptual insights under four key themes: effectiveness of digital nudging, role of UI/UX in consumer behaviour, personalization and algorithmic nudging, and ethical implications and trust in sustainable e-commerce. Statistical data and comparative evidence have been integrated to highlight patterns and gaps.

The study adopted a descriptive research design to examine the role of UI/UX-based digital nudging strategies in shaping green consumer decisions on e-commerce platforms. Primary data were collected through a structured questionnaire administered to 100 respondents who actively use e-commerce services. A non-probability convenience sampling method was employed to ensure participation from individuals familiar with digital shopping environments. The demographic analysis showed that 72 %

of respondents were in the age group of 18–24 years, 68 % were women, and 61 % were students, indicating the predominance of young, tech-savvy consumers. The data collection instrument included multiple-choice questions and Likert-scale statements designed to capture respondents' perceptions of UI/UX elements and nudging techniques that influence sustainable purchasing decisions. Descriptive statistics such as frequencies, percentages, and mean scores were applied to interpret the data.

5. RESEARCH GAP

Despite promising evidence on digital nudging, significant gaps persist in its application to sustainable e-commerce. Existing studies focus primarily on Western markets and isolated interventions like default options, leaving contextual insights for emerging economies like India underexplored (Mirbabaie et al., 1023; Nijssen et al., 2023). Furthermore, research rarely integrates UI/UX aesthetics, behavioral nudges, and trust-based green supply chain practices into a unified framework. Limited empirical work also exists on algorithmic or personalized nudging in real-world e-commerce settings (Wozniak et al., 2022). These gaps underscore the need for comprehensive research that examines how UI-driven nudging can bridge the intention-action gap for green consumer decisions in digital marketplaces.

6. ANALYSIS AND INTERPRETATION

Table 1: Demographic Profile of Respondents

Characteristic	Sub-Category	Percentage (%)
Age Category (in years)	18–24	72
	25–34	18
	35–44	7
	45 & above	3
Gender	Women	68
	Men	32
Occupation	Student	61
	Working Professional	29
	Others	10

Source: Computed from primary data

Inference: Table 1 shows that the demographic profile indicates a significant majority of respondents belong to the 18–24 age group, accounting for 72 % of the sample, followed by 18 % in the 25–34 category. Women constitute 68 % of respondents, reflecting higher female participation in online shopping. In terms of occupation, students form the largest segment at 61 %, while 29 % are working professionals and 10 % fall under other categories.

Table 2: Preferred UI/UX Elements for Green Nudging

UI/UX Element	Percentage (%)
Default eco-friendly option	44
Green badges/icons	32
Impact statistics (e.g., CO_2 saved)	14
Gamified rewards for green choice	10

Source: Computed from primary data

Inference: Table 2 shows that the most preferred UI/UX element for encouraging green nudging is the default eco-friendly option, chosen by 44 % of respondents, followed by green badges or icons at 32 %. Impact statistics such as CO_2 saved were considered effective by only 14 %, while gamified rewards were least favored at 10 %. This indicates that consumers respond best to simple, choice-

based interventions and visual cues rather than complex data or game-like features, highlighting the importance of intuitive design in promoting sustainable e-commerce practices.

Table 3: Perceived Effectiveness of Specific Nudging Techniques

(Scale: 5-Very Effective, 4-Effective, 3-Neutral, 2-Less Effective, 1-Not Effective)

Statement	5	4	3	2	1	Descriptive Mean Score
Default eco-friendly delivery option	40	32	12	10	6	3.90
Highlighting eco-labels on products	38	30	14	12	6	3.82
Personalized green tips	36	28	16	12	8	3.72
Social proof messages	34	30	18	12	6	3.74
Carbon footprint display	32	28	20	14	6	3.66
Free shipping for eco-options	30	28	20	14	8	3.58
Visual eco-friendly icons/badges	28	32	18	14	8	3.58
Brand sustainability rankings	26	30	22	14	8	3.52
Gamified rewards for green choice	24	28	20	16	12	3.36
Countdown timer for eco-deals	22	28	22	16	12	3.32

Source: Computed from primary data

Inference: Table 3 shows that among the ten nudging techniques, the highest mean score was recorded for the default eco-friendly delivery option (3.90), indicating it is perceived as the most effective intervention by respondents. This is followed by highlighting eco-labels on products (3.82), social proof messages (3.74), and personalized green tips (3.72), showing strong acceptance for informative and choice-based strategies. Carbon footprint display ranks next with a mean of 3.66, while free shipping for eco-options and visual eco-friendly icons both hold equal importance at 3.58. Brand sustainability rankings scored 3.52, placing it lower in preference. Gamified rewards for green choices (3.36) and countdown timers for eco-deals (3.32) are the least preferred techniques, suggesting that competitive and time-based nudges have limited influence compared to transparent, value-driven approaches.

Table 4: Consumer Attitude Toward Green UI Features

(Scale: 5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree, 1-Strongly Disagree)

Statement	5	4	3	2	1	Descriptive Mean Score
Eco-options should be clearly highlighted	48	32	10	6	4	4.14
Apps should default to green delivery	44	30	14	8	4	4.02
Sustainability badges improve confidence	42	32	14	8	4	4.00
Verified green certifications build trust	40	34	14	8	4	3.98
Too much green messaging feels overwhelming	18	26	24	20	12	3.18
Gamified rewards motivate me	22	28	24	16	10	3.36
Impact stats influence my purchase decision	38	30	18	8	6	3.86
Prefer to see sustainable brand rankings	36	30	18	10	6	3.80
Social proof statements guide my decisions	34	28	20	12	6	3.72
Personal impact trackers improve my behavior	32	30	22	10	6	3.72

Source: Computed from primary data

Inference: Table 4 shows that the highest mean score is for the statement that eco-options should be clearly highlighted (4.14), followed by apps defaulting to green delivery (4.02) and sustainability badges improving confidence (4.00). Verified green certifications build trust ranks next with a mean of 3.98, while impact statistics influencing purchase decisions stands at 3.86. Preferences for sustainable brand rankings follow closely with 3.80, while social proof statements and personal impact trackers

share similar acceptance at 3.72 each. Gamified rewards recorded a lower mean of 3.36, and the lowest score of 3.18 was for the perception that too much green messaging feels overwhelming. These results indicate that visual clarity, default green choices, and trust-oriented cues are prioritized by consumers, whereas gamification and excessive messaging are less appreciated.

Table 5: Behavioral Impact of Social and Personal Nudges
(Scale: 5-Strongly Agree, 4-Agree, 3-Neutral, 2-Disagree, 1-Strongly Disagree)

Statement	5	4	3	2	1	Descriptive Mean Score
Social proof message ('Most users chose eco-option')	46	32	14	6	2	4.14
Personalized impact report ('You saved 5kg CO_2')	44	32	14	6	4	4.06
Visual badges on checkout screen	40	34	16	6	4	4.00
AI-based green product recommendations	38	32	16	8	6	3.88
Peer comparison dashboard	34	30	18	10	8	3.72
Leaderboard for sustainable buyers	30	28	22	12	8	3.60
Pop-up reminders for green delivery	32	30	20	10	8	3.68
Reward points for eco-friendly purchases	34	30	18	10	8	3.72
Progress bar showing cumulative carbon savings	32	28	22	10	8	3.66
Social media share for eco-achievements	28	28	22	14	8	3.54

Source: Computed from primary data

Inference : Table 5 shows that the highest mean score is for social proof messages such as 'Most users chose eco-option' (4.14), followed by personalized impact reports like 'You saved 5kg CO_2' (4.06) and visual badges on the checkout screen (4.00). AI-based green product recommendations rank next with a score of 3.88, while reward points for eco-friendly purchases and peer comparison dashboards are moderately effective, both scoring above 3.70. Pop-up reminders for green delivery (3.68) and progress bars showing cumulative carbon savings (3.66) follow closely, indicating moderate acceptance. The leaderboard for sustainable buyers (3.60) and social media sharing for eco-achievements (3.54) scored the lowest, suggesting that competitive or socially exposed strategies are less appealing compared to personalized and visually supportive nudges. These findings highlight that consumers favor subtle, informative, and personalized interventions over public or gamified mechanisms when engaging in sustainable choices.

7. FINDINGS OF THE STUDY

(i) Default eco-friendly options emerged as the most preferred UI/UX element, with 44% of respondents favoring it over other strategies, highlighting its strong potential in promoting green behavior.

(ii) Green badges or icons were ranked second, selected by 32% of respondents, indicating that simple and visually intuitive cues influence eco-friendly choices.

(iii) Impact statistics such as CO_2 saved had limited appeal, being chosen by only 14%, suggesting that consumers are less motivated by technical data-driven metrics.

(iv) Gamified rewards were the least favored element, with only 10% acceptance, reflecting low consumer interest in competitive or entertainment-based nudges for sustainability.

(v) Among the ten nudging techniques, default eco-friendly delivery option recorded the highest mean score (3.90), making it the most effective approach for influencing purchase decisions.

(vi) Highlighting eco-labels on products ranked second with a mean score of 3.82, reinforcing the role of transparency and visible indicators in green product selection.

(vii) Social proof messages (mean 3.74) and personalized green tips (3.72) were strongly preferred, showing that both community-driven and tailored cues significantly impact consumer behavior.

(viii) Carbon footprint display (mean 3.66) achieved moderate effectiveness, indicating that while sustainability information matters, it must be simple and easily understood.

(ix) Visual eco-friendly icons and free shipping for green products (both mean 3.58) were moderately accepted, suggesting that value-add features can complement core design nudges.

(x) Gamified rewards (3.36) and countdown timers (3.32) scored the lowest, confirming that urgency-based and gaming elements are ineffective for promoting sustainable behavior in e-commerce.

(xi) Eco-options being clearly highlighted achieved the highest agreement (mean 4.14), showing that consumers value visibility and simplicity in green choices.

(xii) Apps defaulting to green delivery (mean 4.02) and sustainability badges improving confidence (mean 4.00) were next in importance, proving that pre-selected green options and trust symbols strongly influence decisions.

(xiii) Verified certifications (mean 3.98) and impact stats (mean 3.86) were important but slightly less influential compared to default and visual cues, implying that trust needs to be paired with simplicity.

(xiv) Social proof messages ('Most users chose eco-option') recorded the highest behavioral influence (mean 4.14), followed by personalized impact reports ('You saved 5kg CO_2') with 4.06, confirming that community behavior and individual accountability are powerful motivators.

(xv) Competitive and public mechanisms such as leaderboards (mean 3.60) and social media sharing (3.54) were least impactful, signaling that consumers prefer private and personalized green nudges rather than public comparison strategies.

8. SUGGESTIONS

(i) E-commerce platforms should make eco-friendly options the default choice during delivery selection to leverage behavioral nudging and increase green adoption rates.

(ii) Incorporating green badges, icons, and sustainability labels on products can enhance visibility and encourage environmentally conscious decisions.

(iii) Displaying verified green certifications on product pages builds trust and assures consumers about the authenticity of eco-friendly claims.

(iv) AI-driven personalization can suggest sustainable alternatives based on users' purchase history and preferences, improving engagement.

(v) Instead of complex data, platforms should present concise and relatable sustainability metrics such as 'You saved 5kg CO_2' to motivate eco-friendly behavior.

(vi) Messages like 'Most users chose this eco-option' can leverage community influence to guide consumer decisions toward sustainable options.

(vii) Excessive sustainability-related prompts should be avoided as they may cause message fatigue or resistance among consumers.

(viii) Since gamified elements and countdown timers have low acceptance, these should be used sparingly and replaced with informative, value-based cues.

(ix) Providing a comparative view of brands' sustainability efforts can empower informed decision-making and build long-term trust.

(x) Offering simple reward points or cashback for choosing eco-friendly products or delivery options can provide positive reinforcement without creating competitive pressure.

9. CONCLUSION

The study successfully examined how digital nudging through UI/UX influences green consumer decision-making in e-commerce and revealed that simple, intuitive design elements create the most

significant impact. Interventions such as default green delivery options and clear visual indicators emerged as highly effective in encouraging sustainable choices. Consumers showed a strong preference for approaches that are seamless and user-friendly, highlighting the importance of clarity and convenience in digital interfaces. In contrast, features perceived as complex or competitive, such as detailed impact statistics or gamified elements, were less effective, indicating that sustainability-driven design should prioritize simplicity over excessive engagement tactics.

The analysis further established that user awareness of sustainable design interventions translates into meaningful behavioural change when supported by trust and transparency. Verified certifications, eco-labels, and personalized recommendations strengthen consumer confidence and enhance willingness to adopt green options. The preference for private and personalized nudges over public comparison mechanisms reinforces the need for ethical design practices that respect autonomy while influencing behavior positively. Overall, the study underscores the importance of incorporating default green choices, trust-oriented features, and tailored recommendations into e-commerce platforms to foster environmentally responsible consumption and create long-term value for both users and businesses.

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