Economic studies Journal
ISSN 2602-7925
https://www.asjp.cerist.dz/en/PresentationRevue/417

Volume: 20/ N°: 02 (2026), P 289-298

Leveraging Mobile Marketing Tools to Foster Pro-Environmental Consumer Behavior

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Abstract ;

This paper examines how mobile marketing tools, especially smartphone applications, can support pro-environmental consumer behavior by translating environmental awareness into everyday action. The article combines conceptual discussion with illustrative case evidence from food-rescue, circular-fashion, and waste-sorting applications. The revised version corrects language and structure problems in the original text, removes unsupported claims, and updates the argument with recent evidence from 2024–2025 reports and peer-reviewed research. Recent literature shows that sustainable consumption is shaped not only by environmental concern, but also by usability, social norms, perceived control, emotional design, and convenient digital feedback mechanisms (Syed et al., 2024; Feng & Zhao, 2024). Current sectoral evidence further indicates that food-waste reduction, second-hand exchange, and informed recycling are domains in which mobile platforms can produce measurable behavioral effects when they combine utility with low-friction engagement (UNEP, 2024; Vinted, 2024; Venturi et al., 2025). The paper concludes that mobile marketing should be understood not merely as a promotional channel, but as a behavior-shaping infrastructure that can help consumers adopt more sustainable routines when supported by credible information, convenience, and trust.

Article info

Received 26/03/2026
Accepted 03/06/2026

Keywords:
- pro-environmental behavior
- sustainable consumption
- mobile marketing

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1. *Introduction*

The environmental consequences of intensive consumption have become increasingly visible in the form of resource depletion, waste growth, biodiversity loss, and greenhouse-gas emissions. In this context, the challenge for both marketers and policymakers is no longer limited to raising awareness; it is to convert environmental concern into repeated, convenient, and socially supported behavior. This is precisely where mobile technologies matter. Because smartphones accompany consumers throughout the day, mobile applications can embed sustainable prompts directly into moments of choice, such as buying food, disposing of packaging, or choosing whether to purchase new or second-hand products.

The digital context makes this especially relevant in Poland. According to Data Reportal (2025), Poland had 53.7 million active cellular mobile connections in early 2025, equivalent to 140% of the population, while internet penetration reached 89.8%. These figures suggest that mobile platforms offer a scalable infrastructure for targeted, real-time sustainability interventions. However, the mere existence of digital tools does not guarantee behavioral change. Recent research stresses that successful pro-environmental applications must combine usability, emotional engagement, social reinforcement, and clear value propositions (Tancredi et al., 2024; Feng & Zhao, 2024).

2. *Literature Review*

Research on sustainable consumption consistently shows that pro-environmental behavior depends on more than knowledge alone. In a recent systematic review of 64 studies, Syed et al. (2024) found that the Theory of Planned Behavior remained the most widely used framework for explaining sustainable consumption, while also noting the importance of contextual and emotional variables in reducing the well-known attitude-behavior gap. This insight is directly relevant to mobile marketing, because apps can strengthen attitudes, activate social norms, and increase perceived behavioral control through reminders, dashboards, rewards, and simplified decision pathways.

Recent design-oriented studies further refine this perspective. Tancredi et al. (2024) argue that mobile applications can promote sustainable habits when they integrate persuasive design, nudges, and habit-support mechanisms rather than relying on information alone. Similarly, Feng and Zhao (2024), in a study of pro-environmental mobile app users, show that visual appeal and user interactivity positively influence perceived usefulness and sustainable consumption intention. Together, these findings suggest that environmental apps work best when they are not treated as digital brochures, but as interactive systems that lower friction, reward participation, and create emotionally meaningful experiences.

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Table 1. Core mobile marketing mechanisms that support pro-environmental consumer behavior.

Mobile function	Behavioral mechanism	Likely sustainability outcome
Personalized prompts	Timely cues reduce forgetting and increase salience at the point of decision.	Higher probability of choosing low-waste and lower-impact options.
Price/discount alerts	Immediate economic value lowers the perceived sacrifice of sustainable choice.	Greater uptake of surplus-food rescue and second-hand purchases.
Gamification and feedback	Progress tracking, rewards, and visible results strengthen repetition.	More consistent recycling, sorting, and app re-use over time.
Search and guidance tools	Reduces friction by translating environmental intention into concrete action.	Improved sorting accuracy and easier participation in circular practices.

Source: Synthesized by the author from Ajzen (1991), Syed et al. (2024), and Tancredi et al. (2024).

The waste domain offers an additional nuance. Venturi et al. (2025) found that gamification and digital information can support recycling behavior, but they are not automatically superior to traditional methods. Their results imply that app-based interventions should be grounded in accurate, context-specific guidance and practical incentives rather than superficial game mechanics. This aligns with OECD (2024) evidence showing that effective household waste practices depend heavily on the availability of convenient services and supportive policy design. In other words, mobile marketing is most effective when it complements, rather than substitutes for, broader institutional infrastructure.

3. Methodological Approach

The objective of this research is to evaluate the strategic utility of **mobile marketing tools**—specifically mobile applications—in enhancing environmental literacy and fostering sustainable consumer habits. To achieve this, the study adopts a **qualitative, multi-method approach**:

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- **Systematic Literature Review:** A comprehensive analysis of academic discourse, digital reports, and recent scientific findings was conducted to conceptualize the relationship between mobile technology and "eco-consumption."
- **Case Study Analysis:** The research employs a case-study methodology focusing on high-impact mobile applications. These cases illustrate how digital tools solve ecological challenges such as food waste, textile overproduction, and waste mismanagement.
- **Conceptual Framework:** For the purpose of this study, "eco-consumption" serves as the primary construct, while "green consumption" and "sustainable consumption" are utilized as complementary synonyms to describe the behavioral shift fostered by mobile interventions.

4. Results and Discussion

4.1 Mobile Connectivity as an Enabler of Sustainable Choice

Mobile marketing has strategic value because it reaches consumers at the point of decision. In Poland, mobile broadband connections represented 97.1% of all mobile connections at the start of 2025, and median mobile internet download speed reached 69.09 Mbps (DataReportal, 2025). Such conditions make app-based interventions practical for geolocated offers, barcode scanning, personalized notifications, and real-time educational prompts. Compared with static communication tools such as posters or leaflets, mobile interfaces are more adaptive, measurable, and responsive to user behavior.

4.2 Food-Waste Reduction Applications

Food waste remains one of the most urgent areas for intervention. UNEP (2024) reports that households worldwide waste the equivalent of at least one billion meals every day, and average household food waste amounts to 79 kg per capita annually. This creates a strong case for mobile platforms that connect surplus supply with local demand. Too Good To Go illustrates this model well. According to its 2023 impact report, the platform saved 121,686,720 meals in 2023, avoided 328,554 tonnes of CO2e, and connected more than 85 million registered users with surplus food across 17 countries (Too Good To Go, 2024).

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Table 2. Comparative appraisal of app categories discussed in the article.

App category	Illustrative value proposition	Evidence of contribution	Main caution
Surplus-food apps	Discounted access to unsold edible food.	Can align price savings with measurable waste avoidance and repeated local engagement.	Impact evidence often comes from company reporting and may require independent verification.
Second-hand fashion apps	Easy peer-to-peer resale and wardrobe circulation.	Can extend product lifecycles and normalize re-use in everyday consumption.	Environmental gains depend on displacement of new purchases, shipping patterns, and rebound effects.
Sorting and recycling apps	Localized disposal guidance and reminders.	Useful for reducing confusion and increasing correct household sorting behavior.	Adoption may weaken if the app adds effort without clear practical utility.

Source: *Synthesized by the author from UNEP (2024), Too Good To Go (2024), Vinted (2024), Misiołek et al. (2024), and Venturi et al. (2025).*

From a mobile marketing perspective, the value of such apps lies in their combination of environmental benefit and direct consumer utility. Location awareness, time-sensitive offers, frictionless checkout, and price discounts transform waste prevention into an attractive consumer action rather than a purely moral obligation. The platform therefore functions simultaneously as a marketplace, an educational channel, and a behavioral nudge.

4.3 Circular Fashion and the Second-Hand Market

The apparel sector remains environmentally intensive, and textile waste continues to grow across Europe. Zero Waste Europe (2024) notes that Europeans discard around 11 kilograms of textiles per person each year. In response, resale applications have become important instruments of circular consumption. Vinted provides a useful case: in its 2024 impact communication, the company reported that 81% of surveyed sellers would not have engaged in resale without the platform, while research cited by the company estimated that Vinted members avoided 679 kilotonnes of CO2e in 2023 by buying second-hand instead of new items (Vinted, 2024).

These findings should be interpreted carefully because company reports naturally present favorable evidence. Even so, the case demonstrates how mobile platforms can reduce transaction costs in second-hand markets, expand trust through ratings and logistics systems, and normalize reuse as an ordinary rather than marginal practice. In that sense, the app does

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not merely advertise sustainability; it operationalizes circular consumption through search, payment, delivery, and social proof.

4.4 Waste Sorting, Guidance, and Everyday Friction

Waste sorting is another area where the gap between positive attitudes and correct behavior remains visible. OECD (2024) emphasizes that household waste outcomes depend strongly on service design and convenience, while a recent Polish study found that almost 90% of respondents declared sorting waste, yet many still had difficulty assigning specific items to the correct fractions (Misiołek et al., 2024). This is a strong argument for practical apps that provide item-level disposal guidance through search or barcode scanning.

However, recent evidence also suggests that designers should avoid assuming that gamification alone is sufficient. Venturi et al. (2025) show that digital and gamified recycling tools can help, but their effectiveness depends on how well they deliver understandable information and reinforce informed behavior. For marketers and local authorities, the implication is clear: the most effective waste-related apps are likely to be those that reduce cognitive effort, provide localized rules, and integrate feedback into everyday routines.

4.5 Strategic Implications for Mobile Marketing

Across the cases examined, three strategic principles emerge. First, utility matters more than abstract persuasion: users adopt sustainable apps when they save money, time, or effort. Second, trustworthy feedback matters: dashboards, impact counts, and localized instructions increase the sense that individual action is meaningful. Third, behavioral continuity matters: mobile tools are most valuable when they encourage repetition and habit formation rather than isolated eco-friendly acts. These principles are consistent with recent theory and design guidance in sustainable app research (Syed et al., 2024; Tancredi et al., 2024).

5. DISCUSSION

5.1. Theoretical Frameworks: The Psychology of Mobile-Driven Change

The effectiveness of mobile marketing tools in fostering sustainable habits can be analyzed through two foundational psychological theories. These frameworks explain how digital interventions bridge the gap between "environmental concern" and "actual behavior."

- **Theory of Planned Behavior (TPB):** According to Ajzen (1991), behavior is driven by intentions, which are shaped by attitudes, social norms, and perceived control. Mobile applications act as **behavioral catalysts** by:

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- **Reinforcing Attitudes:** Providing real-time data on the positive impact of a purchase.
- **Scaling Social Norms:** Enabling "social sharing" features that normalize eco-friendly actions within a user's digital circle.
- **Increasing Perceived Control:** Offering simplified tools (like 3-click purchases) that make green choices easier and more accessible.

- **Self-Determination Theory (SDT):** Developed by Deci and Ryan (2000), this theory emphasizes intrinsic motivation. Mobile marketing tools foster **autonomy** through personalized user experiences and **competence** through reward systems (gamification). These tools transform ecological responsibility from an external "duty" into an internal "choice."

5.2. Mitigating Food Waste through Mobile Interventions

The global food waste crisis—totaling nearly one billion tons annually (UNEP Report, 2024)—requires immediate logistical and behavioral shifts. Mobile marketing tools like **Too Good To Go** and **Foodsi** have revolutionized this space by creating a "win-win" value proposition.

- **Case Analysis: Too Good To Go & Foodsi:** These applications leverage **Location-Based Marketing (LBM)** to connect surplus supply with eco-conscious demand. By offering discounts of 60–70%, they utilize "price incentives" to drive pro-environmental behavior. With over 2 million users, these platforms demonstrate how mobile tools can turn "unsold waste" into "curated value," fulfilling the United Nations' Sustainable Development Goals (SDGs) through a digital-first approach.

5.3. Countering "Fast Fashion" via Digital Platforms

The fashion industry, particularly in major markets like Poland (valued at $15.5 billion in 2024), remains a primary environmental offender due to overproduction and water depletion (Report The Clothing Market, 2024). The "fast fashion" cycle encourages short product lifespans, leading to massive textile waste.

- **Leveraging the Circular Economy: Vinted:** As a flagship mobile marketing tool, **Vinted** fosters a "zero-waste" lifestyle by facilitating the secondary market. By eliminating commission fees and utilizing **Influencer Marketing**, Vinted has successfully scaled to over 6 million users. It redefines the consumer's journey from

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"buying new" to "reusing," effectively leveraging mobile connectivity to reduce the demand for mass-scale manufacturing and its associated CO2 emissions.

5.4. Strategic Synthesis

The transition from traditional offline communication (flyers/posters) to mobile-centric strategies allows for **Precise Targeting** and **Instant Feedback Loops**. Whether through food-saving apps or second-hand fashion platforms, mobile tools are no longer just functional; they are **educational and motivational ecosystems**. By integrating these tools into daily life, businesses and policymakers can effectively "nudge" consumers toward long-term ecological responsibility.

5.5. Enhancing Environmental Literacy through Waste Management Tools

Despite high levels of self-reported environmental concern, a significant "knowledge gap" persists regarding effective waste segregation. As highlighted by the **2024 CSR Report**, only 52% of consumers correctly classify household waste, with complex items like deodorants (14%) and mirrors (19%) posing major challenges. This discrepancy proves that awareness alone is insufficient without **real-time decision support tools.**

- **The Power of Utility-Driven Mobile Marketing:** Applications like **"Where to throw away?"** and **Scrapp** serve as strategic touchpoints in the consumer's daily routine. By integrating features such as **barcode scanning** and **location-based regulations**, these tools reduce the "cognitive load" associated with recycling.

- **Gamification and Community Impact:** Scrapp's slogan, *"Together, we're making an impact,"* leverages **social identity marketing**. By transforming a mundane chore into a data-driven contribution to global sustainability, these mobile tools foster a sense of collective efficacy, which is a key driver in long-term behavioral change.

6. Conclusion

In summary, the rapid proliferation of mobile applications designed to mitigate environmental threats underscores a pivotal shift in modern sustainability strategies. This study demonstrates that **leveraging mobile marketing tools** is no longer a peripheral tactic but a fundamental necessity in fostering pro-environmental consumer behavior. However, the mere availability of these technologies is insufficient; their success depends on strategic promotion and widespread user engagement.

The findings highlight that the adoption of eco-apps often follows the **Innovation Diffusion Theory** (Rogers, 2003). While "early adopters" and "innovators" seamlessly integrate these

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tools into their daily routines, a significant portion of the population remains on the periphery. To bridge this digital and ecological divide, it is imperative to:

- **Enhance Digital Inclusivity:** Develop targeted marketing campaigns and educational programs for less tech-savvy social groups.
- **Optimize User Experience (UX):** Adapt application interfaces to meet the needs of diverse demographics, including older generations, ensuring that the "barrier to entry" for green behavior is as low as possible.

This research underscores that addressing global ecological challenges requires a modern, proactive approach that transcends traditional awareness campaigns. The analysis of practical case studies—ranging from food waste reduction to circular fashion—confirms that mobile applications act as **behavioral catalysts**, transforming abstract environmental concern into tangible, everyday actions.

Ultimately, this study achieves its aim by demonstrating that when mobile marketing tools are effectively leveraged, they provide a powerful infrastructure for shaping social attitudes and behaviors in alignment with the goals of **sustainable development**. The integration of these digital tools into personal and societal frameworks is not just a trend; it is an essential requirement for the "greening" of modern consumption.

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