Journal of Engineering Innovation and Global Impact (JEIGI)
Volume 1, Issue 2 | PP 41-53 | www.jeigionline.com |

Submitted : 10-09-2026 | Revised : 07-10-2026 | Accepted : 11-10-2026 | Published : 13-10-2026

Gamification and Green Consumer Behavior: A Theoretical Framework for Sustainable Digital Marketing

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Abstract

The gamification approach of implementing game design features in non-game lines of business is a ubiquitous weapon in the sustainable digital marketing arsenal: points for recycling, badges for saving energy, leaderboards for commuting low carbon. The research underlying its adoption is based on a plausible, but little-studied assumption: that to achieve this engagement with green behavior is the same as to create green behavior that is enduring. The concept paper states that this equivalence is not valid and proposes a framework based on the lack of the equivalence. Gamification is known to provide extrinsic, episodic reward-contingent motivation whereas continuous pro-environmental behaviour requires internalised, identity-based motivation, and previous studies confirm that the former undermines the latter. The Gamified Green Internalisation Framework (GGIF) describes two paths to behavior: behavior follows the reward schedule, and behavior is elastic to the removal of the rewards; and elements that support competence, autonomy, relatedness, and meaning contribute to green identity, which in turn lasts after the game. The route emphasized depends on element design, the framing of the norms, and reward salience. The framework also identifies four mechanisms of dark side of gamified green marketing: motivational undermining, moral licensing and negative spillover, moral boomerang of above-average performers, and measurability bias – systematic bias of directing efforts toward measureable micro-behaviors rather than consequential ones. Seven propositions state claims and an operationalisation protocol describes designs for testing the propositions. Consequences for marketers (design for internalisation and plan for reward withdrawal) and for evaluation (outcome variables are persistence and spillover – not engagement). The paper is a conceptual paper and not empirical data are reported.

Keywords: gamification; green consumer behavior; sustainable marketing; self-determination theory; pro-environmental behavior; digital engagement

1. Introduction

Behaviors are the new "technical standard" for sustainable digital marketing. Retail applications give points for returning packaging; utilities rate households on energy dashboards; mobility offers carbon

scores for cycling and punishes their reduction; banks affix carbon scores on transactions and punishes reduction. Gamification – the application of game design in non-game contexts (Deterding et al., 2011)– is the one resource that is in short supply in digital channels, games are one source of engagement, and the environment is in desperate need of engagement.

There is a lack of research support for this practice, but in a particular sense. Gamification research confirms that gamification "works" (with qualifications) – reviews indicate mainly positive effects on engagement and activity measures, the need to tailor to context and user, methodological limitations, as well as short study durations (Hamari et al., 2014; Seaborn & Fels, 2015; Koivisto & Hamari, 2019). Over the years, green-behavior research has documented that attitudes fail to predict behaviour (Kollmuss & Agyeman, 2002), that behaviors do not follow up after interventions, and that the mere act of becoming greener can lead to worse behaviour in other areas, both within and beyond the green act (Thøgersen & Crompton, 2009; Truelove et al., 2014). The domain-specific reviews fall somewhere in between: gamification and serious games in household energy offer potential benefits that seem to be caught up in novelty and evaluation issues (Johnson et al., 2017), and the field evidence indicates that element choice has a significant impact on sustainable-consumption outcomes (Mulcahy et al., 2020).

What's needed is a theoretical explanation of what occurs when an engagement technology for schedules of external reward is implemented in a behavioral domain characterized by a persistence problem without external reward. The join is not innocent. The self-determination theory distinguishes between motivation based on externalized contingencies, and motivation based on internalization of the behavior; and there is an extensive experimental literature demonstrating that justification or reward for already existing behavior can lead to significant and observable loss of the behavior. If gamified green marketing does indeed attract users with these types of incentives, then it doesn't seem like an extreme scenario to consider that it might result in weak, rather than robust, green behavior. It is the key question for theory and it is very rarely asked.

This paper asks it in three parts:

> RQ1. Through what motivational routes do game design elements translate into green consumer behavior, and what distinguishes behavior that persists from behavior that tracks the reward schedule?
>
> RQ2. Which element designs, norm framings, and contextual conditions determine the dominant route?
>
> RQ3. By what mechanisms can gamified green marketing reduce net environmental benefit, and how should the practice be evaluated if those mechanisms are real?

The contributions are the Gamified Green Internalisation Framework, a dual-route model from elements to outcomes (Section 4.2)an element-affordance mapping (Section 4.3), a named set of four dark-side mechanisms (Section 4.4), and seven propositions with an operationalisation protocol (Section 4.5). Throughout, engagement is treated as an intermediate variable and never as the outcome: the outcome variables of sustainable marketing are persistence and net behavioral spillover. The paper is conceptual and reports no data.

2. Literature Review

2.1 Gamification: What Is Established

The elements of the definitional settlement game in non-game contexts (Deterding et al., 2011), which were anchored for marketing purposes as support for the overall value creation of users (Huotari & Hamari, 2017) through gameful experience is relevant here because the focus is on the level of game elements and not games: points, badges, leader boards, levels, challenges, narratives. Empirical reviews come to three conclusions pertinent to this paper. The impact on engagement is mostly positive, with caveats regarding context and user (Hamari et al., 2014; Seaborn & Fels, 2015). The literature has now professionalized to take the name motivational information systems and the main

focus is on self-determination theory (Koivisto & Hamari, 2019). And study horizons are short; wherever scholars have taken a look, they've found it's possible for gamifying conditions to result in decreased intrinsic motivation over time, as was observed in the classroom in Hanus & Fox (2015). The line has been drawn in the box of design scholarship between 'reward-centred gamification' and 'meaningful gamification'—where the meaningful is that which connects to the values of the user (Nicholson, 2015).

2.2 Green Consumer Behavior: What Is Established

The constraints that any framework must meet are provided by green-behavior research. The attitude–behaviour gap, lying at the core of the problem, is characterized by the fact that level of environmental concern is a poor and weak predictor of environmental behaviour (Kollmuss & Agyeman, 2002; Peattie 2010). Interventions are more effective when they target the determinants and contexts of a behavior (Steg & Vlek, 2009), and the marketing synthesis of this literature classifies the levers of marketing as social influence, habit formation, individual self, feelings and cognition, and tangibility (White et al., 2019). Two forces come into play for what is to follow. First, there is spillover, which may be positive (increasing the chance of further green acts, typically identity-mediated) or negative (licensing the omission of further green acts; see Thøgersen & Crompton, 2009; Truelove et al., 2014), and campaigns that rely on first-step acts which are "simple and painless" have been directly criticized for their dependence on positive spillover. Second, norms: descriptive-norm feedback is shown to have a boomerang effect, whereby above-average performers regress toward the norm unless they are given injunctive-norm feedback, the desirable one, which sets their direction (Cialdini et al., 1990; Schultz et al., 2007), and this effect has been shown to operate at a utility scale (Allcott, 2011). A third condition, status motives, is that green options must be visible and identity-relevant, meaning that they must be salient in people's social context (Griskevicius et al., 2010). Finally, the findings from the intervention literature are relevant to persistence: when the behaviors are carried out repeatedly in consistent environments they can become 'habit-like' and so no longer need to be motivated by either deliberate or automatic processes (Steg & Vlek, 2009; White et al., 2019). This is a second route out of the reward-contingent one, then, in the case of habit formation. The framework does not consider internalisation as a direct competitor with automation; high-frequency, low-cost behaviors (sorting, switching off) are most likely to be automated; the identity-relevant and effortful ones, on the other hand, are most likely to be internalised.

2.3 The Intersection: Practice Ahead of Theory

The literature in the intersection of the two fields is encouraging and used, but with limitations. Element choices in energy domain reviews show differential effects (Johnson et al., 2017); field studies of gamified sustainable-consumption apps reveal differential effects (Mulcahy et al., 2020). The intersection is lacking in theory proportional to its stakes, a model that explains why gamified green behavior will or won't carry over into the real world, jointly based on the motivational dynamics (Section 2.1) and behavioural constraints (Section 2.2). Table 1 provides a summary of the streams and the join created in this paper.

Table 1. *Literature streams and the unbuilt join*

Stream	Establishes	Key sources	What it does not supply
Gamification	Engagement effects, conditionality, SDT lens, temporal decline	Deterding et al. (2011); Hamari et al. (2014); Koivisto & Hamari (2019)	Whether engineered engagement internalises

Stream	Establishes	Key sources	What it does not supply
Green consumer behavior	Attitude–behavior gap, spillover, norm dynamics, intervention design	Kollmuss & Agyeman (2002); Steg & Vlek (2009); White et al. (2019)	The digital engagement layer now mediating campaigns
Motivation theory	Locus of regulation; reward undermining of intrinsic motivation	Ryan & Deci (2000); Deci et al. (1999)	Application to element-level green design
Intersection studies	Domain feasibility; element-level effect variation; novelty confounds	Johnson et al. (2017); Mulcahy et al. (2020)	A framework predicting persistence and net benefit

3. Research Methodology

3.1 Design

This is a conceptual paper using a theory-synthesis mode, meaning that it combines gamification research, pro-environmental behavior research and self-determination theory in a way that none of these alone can explain (Jaakkola, 2020). The right design is synthesis, as each of the component literatures is already well developed and the meeting place of the unanswered question is the joint. Adequacy meets the standard criteria for conceptual contribution: explicit constructs, specified relations, theoretical justification, boundary conditions (Whetten, 1989) but with the added criteria that the framework must do more than summarise, it must predict which gamified green interventions can produce persistent behaviour as opposed to which can produce reward-tracking behaviour or net harm (MacInnis, 2011).

3.2 Procedure

The development was in four stages. So, first, the outcome variable was constrained by the green-behavior literature—engagement was reordered, down stream from the constraints of persistence and net spillovers. Second, the motivational core was defined by aligning the classes of elements of gamification with the regulation continuum of self-determination theory (Ryan & Deci, 2000) to create the dual-route structure. Thirdly, the framework was stress-tested by these four most well documented adverse dynamics identified in the source literature, all of which were given a name rather than treated as an anomaly. Fourth, propositions were drawn at each relation and a protocol on Operationalisation was developed with placeholder estimands.

3.3 Scope and Boundary Conditions

It proposes a framework for the consumer side of digital marketing of pro-environmental behaviours (consumption, energy, mobility, disposal) via gamified interfaces. It does not cover other organisational sustainability programmes, environmental education for minors, full games meant for other than entertainment (serious games) which have different dynamics. Engagement wear-out is a standing boundary condition: gamification fatigue is produced by the repeated exposure and affects all relations in the framework; whereas the antecedents of gamification fatigue are a research programme

of their own. No empirical data was gathered, instead the quantities in the protocol are in placeholder notation.

4. The Gamified Green Internalisation Framework

4.1 Constructs

Table 2. *Constructs of the framework*

Construct	Definition	Indicative measurement
Element exposure	The set and intensity of game design elements a consumer encounters	Instrumented interface logs; element inventories
Engagement	Behavioral and psychological investment in the gamified system	Session frequency/duration; validated engagement scales
Reward contingency	Degree to which target behavior is performed because of expected extrinsic reward	Behavioral elasticity to schedule changes; self-report regulation scales
Internalisation	Integration of the target behavior into personal values and identity	SDT regulation continuum instruments; green self-identity scales
Green identity	Self-definition as an environmentally responsible consumer	Established identity scales
Persistence	Continuation of target behavior after reward withdrawal or platform exit	Longitudinal behavior post-intervention
Net spillover	Signed sum of induced changes in non-targeted environmental behaviors	Multi-behavior panels; consumption records where available

4.2 The Dual-Route Core

The framework is shown in figure 1. Engagement is created by game elements, as the evidence shows (Hamari et al., 2014) but there are two motivational pathways with distinct signatures. For reward contingent route, it's the element contingencies that control the behavior: points, prizes, streaks, rank. It shows elasticity behavior that follows the schedule, increases with salience of rewards, and decreases at withdrawal, but the literature cautions that the decrease can become negative, below baseline, where intrinsic motivation existed prior to the onset of the game (Deci et al., 1999). On the internalisation route elements serve as supports for the needs that are identified by self-determination theory: competence (progress, mastery feedback), autonomy (choice, self-set goals), relatedness (community, cooperation) and meaning (connection of play to the consumer's own values; Ryan & Deci, 2000; Nicholson, 2015). Its defining characteristic is its persistence, increasingly sustained by

green identity, and rarely by the interface, it survives reward withdrawal and it creates the green identity-mediated positive spillover that the green literature reports (Truelove et al., 2014).

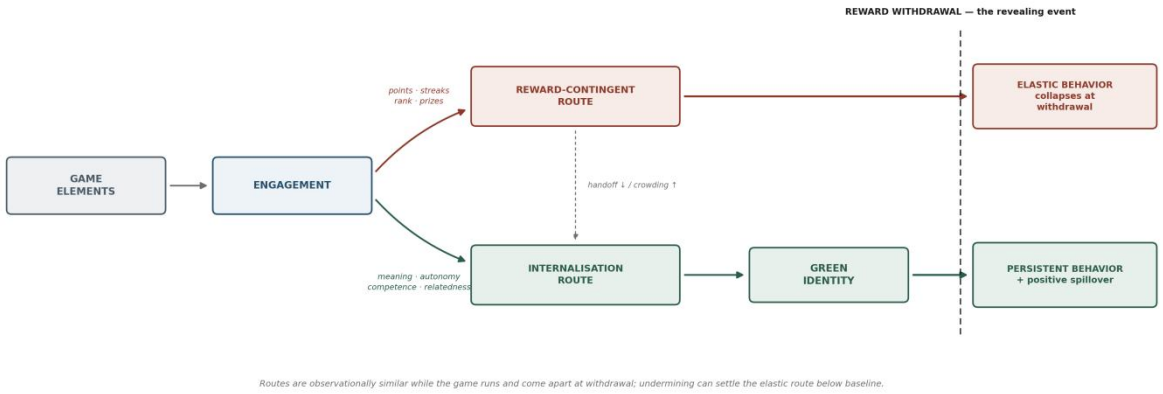


Figure 1. *The Gamified Green Internalisation Framework: two routes from game elements to environmental outcomes, with reward withdrawal as the revealing event.*

Routes are not element-exclusive—the same badge can feed into either—but they are design-biased and the heart of the framework is the ability to choose the bias that is used, and that it is useful. Nor are the routes fixed alternatives, they interact over time and interaction may flow in both directions. The benign sequence is the handoff: the extrinsic elements recruit and scaffold early behavior, competence builds up, community develops, and meaning framing adds the behavior to the consumer's values, gradually bringing the behavior closer to the consumer's values, and eventually bringing regulation from the outside inwards, before the rewards lose their power, the industry's implicit bet being the one that would be played theoretically coherent. The malign sequence is depriving salient contingent rewards that are added to environmental motivation, and reattaching the behavior to the environment, away from regulation (Deci et al., 1999). The sequence that is obtained is not a property of gamification per se, but a property of the design details of reward salience in relation to meaning framing, of autonomy supports, and of the timing of tapering contingencies. The framework thus neither the enthusiast's nor the purist's claim (gamification motivates green behavior or extrinsic rewards corrupt it) is underspecified; the unit of analysis is the element portfolio and the sequence of it. The revealing event of the framework is "reward withdrawal": It's the time when the routes, which are similar at the time of the game, separate. This provides the framework with an identification and a claim persistence because the observable after withdrawal is the only one that differentiates between what the engagement metrics mix up.

4.3 Element Affordances

Figure 2 and Table 3 represent a mapping of the standard element classes onto two design axes: regulation bias (extrinsic ↔ internalising) and social structure (individually ↔ collectively). The mapping reflects a formalisation of what evidence in the field suggests and what design theory says - element choice as outcome choice (Mulcahy et al., 2020) and what design theory prescribes (Nicholson, 2015). Efficient recruiters, elasticity risks, are points, prizes, and streaks that reside in the extrinsic-individual quadrant. The leaderboards we present in this paper offer sociality without altering the rules, and bring in the boomerang factor in full force (Schultz et al., 2007). Cooperative goals and community features lead to relatedness, which is the need most clearly associated with continued use of systems (Koivisto & Hamari, 2019), while narrative and challenges set by the participant encourage internalisation. Motives for visibility include shared accomplishments, public profiles, and

engagement status, and they are found to be effective for green behaviors where behaviors are clearly visible (Griskevicius et al., 2010).

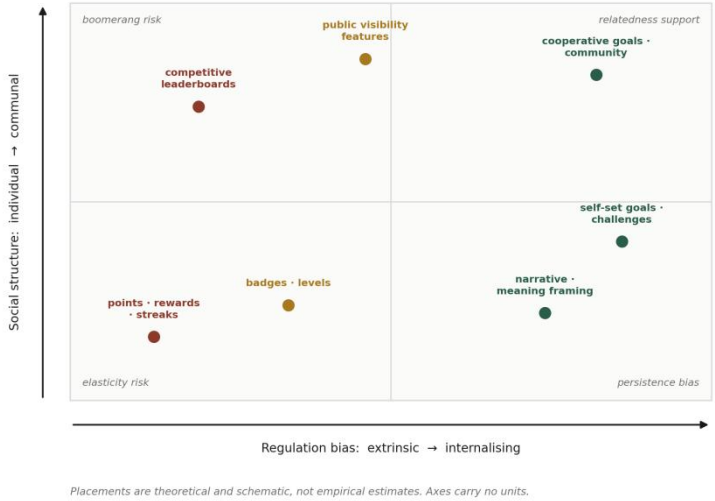


Figure 2. *Element classes mapped by regulation bias and social structure. Placements are theoretical and schematic, not empirical estimates.*

Table 3. *Element classes, affordances, and green-marketing risks*

Element class	Primary affordance	Regulation bias	Characteristic risk in green contexts
Points, rewards, streaks	Immediate contingent feedback	Strongly extrinsic	Elasticity; undermining of prior intrinsic motivation
Badges, levels	Progress and status markers	Mixed	Tokenismcompletion substitutes for impact
Competitive leaderboards	Social comparison	Extrinsic, social	Boomerang among above-norm performers; discouragement at the bottom
Narrative and framing	Meaning; value connection	Internalising	Greenwashing exposure if narrative outruns substance
Self-set goals, challenges	Autonomy and competence	Internalising	Goal choice drifts toward the easily measurable
Cooperative and community features	Relatedness; collective efficacy	Internalising, social	Free-riding; clique effects

Element class	Primary affordance	Regulation bias	Characteristic risk in green contexts
Public visibility features	Status: conspicuous conservation	Mixed	Performative signalling decoupled from behavior

4.4 Dark-Side Mechanisms

The unique element in the framework is that green marketing can have a negative impact on the environment by four identifiable ways, as outlined in Table 4. For consumers who were already motivated to arrive at the game, contingent rewards lead to a decrease in intrinsic regulation of post-game behavior relative to pre-game levels (Deci et al., 1999), known as motivational undermining. Consumers that are easiest to recruit on the green platforms are: Rewarding a negative behaviour with moral credentials via licensed spillover: the moral justification for non-targeted brown behaviour is rewarded with gamified micro-accomplishments (Thøgersen & Crompton, 2009; Truelove et al., 2014). Normative boomerang: if the comparison elements move from above-norm to below-norm consumers, and injunctive framing is not engineered in, then the comparison elements move up, and vice versa (Allcott, 2011; Schultz et al., 2007). Measurability bias: since gamification tracks behaviour, action is directed towards the measurable, and away from the measurable but important; the platform's measure becomes the consumer's ontology of "being green". The framework is that gamified green marketing is a machine that puts all four together, and that an evaluation that measures engagement will not register any of them: each of them is individually documented in its source literature.

Table 4. *Dark-side mechanisms*

Mechanism	Dynamic	Theoretical source	Evaluation signature
Motivational undermining	Reward displaces intrinsic regulation; post-withdrawal behavior below baseline	Deci et al. (1999); Ryan & Deci (2000)	Only visible after withdrawal; invisible to engagement metrics
Licensed spillover	Green micro-acts license brown macro-acts; net effect negative	Thøgersen & Crompton (2009); Truelove et al. (2014)	Requires multi-behavior measurement
Normative boomerang	Above-norm performers regress toward comparison levels	Schultz et al. (2007); Allcott (2011)	Requires performance-stratified analysis
Measurability bias	Effort reallocates toward trackable micro-behaviors	Framework-derived; cf. Steg & Vlek (2009) on determinant matching	Requires impact-weighted, not count-weighted, outcomes

A final design that crosses the map tapering. The transition into the withdrawal is designable, the contingencies can be reduced gradually and predictably, and supports can be internalized while the likelihood of the transition increases. The conditions in the undermining literature are tangible, expected, contingent rewards, which means that there is less crowding risk for unexpected and noncontingent recognition (Deci et al., 1999); thus, a tapering schedule is the design translation of "plan the exit" from the undermining literature. The propositions are testable in order to see whether tapering is most effective at maintaining behavior over time compared to abrupt withdrawal.

4.5 Propositions and Operationalisation

Table 5. *Propositions of the framework*

ID	Proposition
P1	Extrinsic-biased elements raise engagement faster than internalising elements but produce behavior with higher elasticity to reward withdrawal.
P2	Internalising elements (meaning, autonomy, relatedness supports) increase green identity, which mediates behavioral persistence after withdrawal.
P3	For consumers with high prior environmental motivation, salient contingent rewards reduce post-withdrawal behavior below pre-intervention baseline (undermining).
P4	Gamified attainment of micro-behaviors increases moral licensing of non-targeted behaviors; the effect weakens as green identity strengthens.
P5	Competitive comparison elements produce boomerang regression among above-norm performers unless paired with injunctive framing.
P6	Element portfolios steer behavior toward trackable actions in proportion to reward salience (measurability bias), independent of environmental impact.
P7	Net environmental benefit is a function of the internalisation share of induced motivation, not of engagement level; engagement is uninformative about net benefit once route composition is controlled.

Figure 3 renders the framework's temporal signature: the reward-contingent route rises fast and breaks at withdrawal, with the undermining case settling below baseline while the internalisation route rises slower and holds.

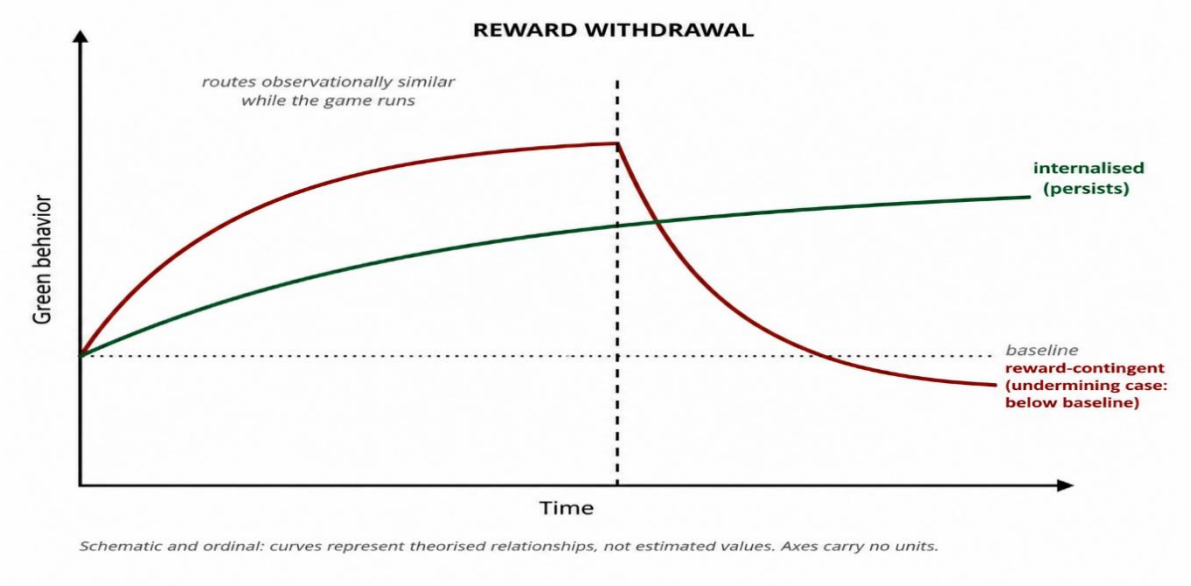


Figure 3. *Theorised behavior trajectories by dominant route, with reward withdrawal marked. Curves are schematic and ordinal, not estimated values.*

Operationalisation is challenging but feasible. P1–P3 must have longitudinal designs with a designed withdrawal. One reason why the routes haven't been separated is that they have short horizons, as described by Hamari et al. (2014) and Johnson et al. (2017), defined in terms of SDT regulation instruments and estimands in placeholder form (elasticity δ_w = [to be estimated]; undermining Δ_below-baseline = [to be estimated]). In P4, multi-behaviour panels are required, in P5 stratified norm-position analysis, in P6 an impact-weighted behaviour inventory is compared to the platform's count-weighted one, in P7, the joint model. No one is foreign, all are missing.

5. Discussion

5.1 Theoretical Implications

The framework is a re-positioning of three literatures in relation to each other. In the context of gamification research, it transforms the known shortcomings of the field, namely its short-term focus and the nature of outcomes as engagement-focused (Hamari et al., 2014; Koivisto & Hamari, 2019) into a substantive prediction: the lack of long-run studies is exactly where the routes go astray, and the evidence base is systematically uninformative about what matters in the long-term. It provides the digital layer for green-behavior research: spillover, licensing, and norm dynamics were set-up in the campaigns and feedback letters (Allcott, 2011), and how these are transformed when the intervention is an always-on, reward-scheduling interface is specified. For sustainable marketing, it moves the centre of the framework - P7 is the centre, engagement is route-composition-uninformative; the field's default measure is the wrong one with precision. Its own methodological economy is not a bad thing, and in fact is constitutionally required for cross-sectional studies to provide unambiguous answers; a design choice that has been a problem for the intersection literature, because the routes vary in shape rather than level, fast-rise-and-break versus slow-rise-and-hold (Figure 3) (Hamari et al., 2014; Johnson et al., 2017). The shape of a trajectory is the discriminating observable that is measured within the framework, not the level reached at the end of the trajectory.

5.2 Practical Implications

For the marketers, the framework isn't a toolbox, but a sequence of design; hire with outside rewards if needed, but design the hand off meaning; use self-prescribed goals as framing; build a community, with regulation moving inward, rather than a reward, and understand that the most impactful behavior might not be the most gamifiable; pair every leader board with injunctive framing, and know that it's possible for the most consequential behaviors to be the ones that don't happen online. The contra-cyclical implication is an uncomfortable and testable one for evaluators and brands claiming to be green; that is, some would find their engagement programmes to have modest or even negative net effects under an evaluation regime that included the measures in Table 4's final column: measure after withdrawal, measure non-targeted behaviours, stratify by norm position, and impact-weight an evaluation regime.

5.3 Limitations

The framework is conceptual and untested, and its demands are real: separation of routes necessitates longitudinal designs that include separation stages; net spillover necessitates the measurement of many behaviors, which is difficult in a self-report context; green identity is a mediator and moderator across propositions, which complicates the identification issue. The dark-side mechanisms are all supported by source literature, whereas the joint operation of the dark-side mechanisms in gamified green contexts is a conjecture. Fatigue is assumed to be exogenous due to scope condition, but the pattern of fatigue is likely to influence route composition. But the propositions do not address the political economy of the internalisation of designs, and the framework brackets out the platform's own incentive engagement-maximising business models may select against internalisation.

5.4 Future Research

Priority is the route-separation study (a longitudinal field experiment of randomised element portfolios and designed withdrawal, tested together); sustainable-consumption apps with cooperative research partners are the natural site (cf. Mulcahy et al., 2020). The similar nature of the data and the need for a dedicated measurement contribution and an impact-weighted green behavior inventory currently means that the whole applied literature is subtly biased towards the trackable trivia of P4 and P6. P5 can be tested on any comparable platform that will randomise the framing. There are two natural extensions, endogenising fatigue, where the fatigue of wear-out and platform internalisation take one another's breath away, and modelling platform incentives, in which the question is how the market conditions are supposed to look like in order for internalising design to be privately optimal and not just socially desirable.

6. Conclusion

Gamification brings with it the gift of digital channels for engaging people and sustainable marketing has taken it and doesn't ask what it's made of. The answer to this question is that it is motivated with a locus, and the locus determines all. Behavior under the control of the reward schedule fits the schedule: it's earned with the points, it's lost with the points, and committed points, if they're already in the ledger, can be lost by the already-committed. If the elements are designed to represent competence, autonomy, relatedness and meaning, the behaviour is internalised, continues beyond the game and is shared. The Gamified Green Internalisation Framework assigns the distinction constructs, routes, moderators and dark-side mechanisms, and moves the evaluation to the level of engagement and persistence and net spillover. The game is the scaffolding, not the building, and the test of the scaffolding is what stands when it comes down is the short-term moral of green marketing.

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Declarations

Conflict of Interest
The authors declare no conflicts of interest related to this study.

Funding Statement
This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

Ethical Approval
This study did not involve any human or animal subjects and, therefore, did not require ethical approval.