



Peer-Review Report Form

Manuscript Title:	Ecosystem-Level Manipulation: How Digital Choice Architecture and Dark Patterns Reconfigure Consumer Autonomy in E-Commerce Frameworks
Type of Article:	Original Article

FIRST ROUND

Editor

<u>General Comments and Recommendations</u>
The reviewers acknowledge the significance of your manuscript and recommend several revisions to further improve its clarity, coherence, organization, and overall scholarly quality. In addition, you are advised to thoroughly review and validate all references included in the manuscript. Please ensure that all cited sources are accurate, accessible, and retrievable through Google Scholar to uphold the credibility and reliability of the study. Additionally, make sure to include the DOI or website link for every reference to facilitate verification and accessibility of sources. Furthermore, only sources that are cited within the manuscript should appear in the References section, and all entries listed in the References section must also be cited in the text. For example, if 20 unique sources are cited in the manuscript, then only those 20 sources should be included in the References section. Please note that repeated citations of the same source within the text are counted as a single reference entry; therefore, the total number of references may be lower than the total number of in-text citations.

Reviewer 1

<u>General Comments and Recommendations</u>
Overall, the paper has a very strong theoretical foundation, borrowing nicely from Socio-Technical Systems Theory and Self-Determination Theory. The shift from identifying dark patterns to actually proposing an Information Systems Design Theory (ISDT) to mitigate them is a great contribution. However, the execution in the methodology and results sections currently lacks the rigor expected by a top-tier journal. There are missing elements in your mathematical formulations, noticeable copy-paste repetitions in your results, and a lack of transparency regarding how the experiment was actually conducted. Kindly address these major issues to ensure your findings are credible and reproducible.



Specific Comments and Recommendations

The most critical issue I found is in your mathematical modeling section. You introduced the modified logit framework properly. However, when you were about to present the formula for the Cognitive Compounding Coefficient, the equation is completely missing. There is no equation between the colon and the "Where" clause. You must provide the actual mathematical formula so readers can understand how the exponential expansion is calculated.

For an empirical choice experiment with $N = 1,200$, the experimental design section is too brief. Please expand Section 3.1. Who are these 1,200 participants? What is their demographic profile, and how were they sampled? What was the exact task they were asked to do in the simulated e-commerce environments? To ensure internal validity, readers need to know what the control and manipulated platforms looked like and what specific products or scenarios the users were navigating.

There is a noticeable repetition in how you presented the data, which takes away from the professionalism of the manuscript. Table 2 (Empirical Testing Results) and Table 3 (Empirical Evaluation Results) display almost the exact same data. Table 2 shows E0, E1, and E2, while Table 3 simply repeats these three and adds E3 (De-Biased Design). I suggest merging these into one comprehensive table to save space and avoid redundancy. In Section 4.2, you repeated the exact same finding from Section 4.1 verbatim. Specifically, the sentence "Although average session duration increased by 42% due to asymmetric friction mechanisms, the Involuntary Conversion Rate increased disproportionately to 68%..." appears in both sections. Kindly revise the structure of Section 4 so that 4.1 focuses strictly on ELM formation, 4.2 focuses strictly on the statistical/mathematical degradation (ANOVA/Chi-square results), and 4.3 discusses the design artifact without repeating the descriptive stats.

In Section 4.2, you suddenly presented results for a one-way ANOVA and a chi-square test of independence. However, there is no mention of your data analysis plan in the Methodology section. Kindly add a subsection in Section 3 detailing the statistical treatments you planned to use to analyze the differences in the User Autonomy Index and Involuntary Conversion Rates across the experimental environments.

Please indicate your recommendation by checking the appropriate box below.

<u>Decision</u>	
	Accept the manuscript for publication.
/	Reconsider the manuscript after the authors have satisfactorily addressed and complied with the reviewers' comments and recommendations.
	Reject the manuscript, as it is not suitable for publication.



Reviewer 2

<u>General Comments and Recommendations</u>
The manuscript addresses a timely and important issue in Information Systems, particularly the combined effect of dark patterns on consumer autonomy. The proposed concept of Ecosystem-Level Manipulation has potential because actual e-commerce platforms typically use multiple manipulative features rather than a single one.
<u>Specific Comments and Recommendations</u>
The authors claim that asymmetric friction, cognitive overload, and covert redirection interact in a non-additive manner. However, the design only compares a control condition, an isolated manipulation condition, and a condition where all three dark patterns are combined. The isolated manipulation condition is also unclear because it is described as containing “single dark patterns deployed independently,” but it is treated as one experimental environment. It is not stated whether participants received different individual patterns or only one common pattern such as a countdown timer. This design cannot establish whether the combined effect is greater than the sum of the individual effects. A proper factorial experiment is needed, preferably one that independently manipulates the presence or absence of each of the three vectors. This would permit estimation of the main effects and the two-way and three-way interaction effects. At minimum, each individual vector and relevant combinations must have separate conditions. Without this, the finding that E2 produced a stronger outcome than E1 only shows that a more intensive manipulation produced a larger effect. It does not demonstrate cognitive compounding or ecosystem-level synergy.
The manuscript reports a sample of 1,200 participants, but it does not explain how they were recruited, what population they represent, the inclusion and exclusion criteria, demographic characteristics, prior e-commerce experience, or how the sample size was determined. The number of participants assigned to each condition is also missing. The randomization procedure, allocation concealment, attrition, incomplete responses, and data-cleaning rules should be reported. The simulated e-commerce environment also needs a complete description. The authors should explain the product category, alternatives presented, price levels, number of choice tasks, sequence of screens, duration of exposure, and exact implementation of every dark pattern. Screenshots or supplementary materials containing the experimental interfaces would be necessary. Manipulation checks should confirm that participants actually noticed the scarcity cues, default options, cancellation friction, and other intended mechanisms. Since the study intentionally exposes participants to deceptive and manipulative designs, the paper must also report ethics approval, informed consent procedures, use of deception, participant debriefing, compensation, and protection of participant data.
The User Autonomy Index is the main dependent variable, but the manuscript does not provide its items, scoring procedure, scale anchors, theoretical dimensions, reliability, or validity evidence. It is also not clear whether the index represents perceived autonomy, actual ability to choose, decision confidence, resistance to manipulation, or a combination of these outcomes. These concepts should not be treated as interchangeable. The vulnerability index, λ, is also problematic. It combines a six-item instrument adapted from cognitive reflection tests with a digital literacy and dark-pattern awareness scale, but the basis for combining these measures is not established. The authors should report the original sources, adaptation process, factor structure, reliability, weighting of the components, and evidence that the



combined score measures one coherent construct. The assumption that $\lambda = 0$ represents a person who is “completely resilient” to interface manipulation is also too absolute and has no clear empirical basis. “Involuntary conversion” requires stronger measurement as well. The manuscript defines it as completion of an unintended purchase, subscription, or add-on, but it does not explain how unintendedness was determined. The authors need to show whether this was based on a pre-task intention, post-task confirmation, behavioral discrepancy, or self-report. Otherwise, a completed transaction cannot automatically be classified as involuntary.

The methodology states that participants were assigned to three environments: E0, E1, and E2. However, the results introduce a fourth environment, E3, which represents the De-Biased Design. The one-way ANOVA also reports four groups, as shown by the degrees of freedom, but E3 is not included in the experimental design, participant allocation, procedure, or randomization description. The authors should clarify whether E3 was part of the original experiment, a separate follow-up experiment, or an evaluation conducted using another sample. If all four conditions used the same total sample of 1,200, the number assigned to each group must be reported. If E3 was introduced later, the sample, procedure, and analysis for this phase must be presented separately. This inconsistency currently makes the evaluation of the proposed artifact difficult to trust.

The decline from 88% to 26% is a reduction of 62 percentage points, not a 62% relative reduction. The relative reduction is larger and should be calculated correctly. Similarly, the involuntary conversion rate increased to 68% from 4%; it did not simply increase “by 68%.” The abstract and conclusion should distinguish between percentage-point changes and relative percentage changes. The abstract also states that autonomous choice velocity was reduced by 42%, while the results state that average session duration increased by 42%. These are not automatically the same measure. A longer session may indicate friction, hesitation, confusion, careful consideration, or technical difficulty. It cannot be interpreted as reduced autonomous choice velocity or cognitive burden without a clear definition and supporting analysis. All numerical claims in the abstract, results, and conclusion should be recalculated and made consistent with the actual measures.

Please indicate your recommendation by checking the appropriate box below.

<u>Decision</u>	
☐	Accept the manuscript for publication.
☐	Reconsider the manuscript after the authors have satisfactorily addressed and complied with the reviewers' comments and recommendations.
☐	Reject the manuscript, as it is not suitable for publication.



SECOND ROUND

<u>Decision</u>	<u>Editor</u>	<u>Reviewer</u> 1	<u>Reviewer</u> 2
Accept the manuscript for publication.	/	/	/
Reconsider the manuscript after the authors have satisfactorily addressed and complied with the reviewers' comments and recommendations.			
Reject the manuscript, as it is not suitable for publication.			