

Impact of the CCPA Advisory on Consumer Perception of Dark Patterns in Quick Commerce Platforms

Neha Ravikant Goshte

Research Scholar, Sasmira's Institute of Management Studies & Research, (Affiliated to University of Mumbai), Mumbai

Dr. Rupali More

I/C Director, Sasmira's Institute of Management Studies & Research, (Affiliated to University of Mumbai), Mumbai

Abstract

Technology has both pros and cons too. It can make or break the businesses. The quick commerce platforms, with nearly 33 million monthly active users, have transformed urban retail through ultra-fast delivery and seamless digital experiences. The increasing use of deceptive UI/UX techniques, known as dark patterns, has raised concerns about consumer autonomy and informed decision-making. To address these issues, the Central Consumer Protection Authority (CCPA) issued an advisory on 5 June 2025 directing digital platforms to conduct self-audits and eliminate dark patterns, promoting transparency and ethical interface design. Despite this regulatory initiative, limited research has examined consumer awareness and perceptions of its effectiveness in the quick commerce context. This quantitative study, based on responses from 182 quick commerce users in the Mumbai region, assesses awareness of dark patterns, consumers' ability to identify deceptive practices, and perceptions of the CCPA advisory. It further evaluates the influence of post-regulatory UI/UX changes on consumer trust and confidence, offering practical insights for policymakers and platform operators to strengthen digital consumer protection while supporting sustainable business growth.

Keywords: *Dark Patterns, Quick Commerce, Consumer Protection Law, CCPA Advisory, E-commerce*

Submitted: April 30, 2026

Revised: May 20, 2026

Accepted: June 3, 2026

Published: June 15, 2026

DOI: [10.5281/zenodo.21317857](https://doi.org/10.5281/zenodo.21317857)



1. Introduction

The digitalization has revolutionized the ways of doing businesses. The rapid expansion of internet connectivity and smartphone penetration has fundamentally reshaped consumer purchasing behaviour, particularly following the COVID-19 pandemic, by creating strong demand for speed, convenience, and seamless digital shopping experiences. These changing expectations have accelerated the adoption of quick commerce (q-commerce) platforms such as Blinkit, Zepto, and Swiggy Instamart, which promise deliveries within 10–30 minutes across diverse product categories, including groceries, medicines, electronics, and premium consumer goods. Industry projections indicate that India's q-commerce market is expected to expand at an annual growth rate exceeding 40% through 2030, supported by increasing digital adoption, expansion into Tier-II and Tier-III cities, and rising consumer preference for instant fulfilment. This rapid growth has positioned quick commerce as one of the fastest-growing segments within India's digital economy (RedSeer Strategy Consultants, 2025). While quick commerce enhances consumer convenience, its competitive environment has encouraged the widespread use of manipulative interface designs known as dark patterns. These deceptive UI/UX practices exploit users' cognitive biases through techniques such as false urgency, hidden costs, confirm shaming, and interface interference, influencing consumers to make unintended purchasing decisions or subscriptions. Such

practices undermine informed consent, reduce consumer autonomy, and erode trust in digital marketplaces. All of these lead to the digital stress at times (Gaikwad & Bhattacharya, 2024). Recognizing these concerns, the Department of Consumer Affairs introduced the Guidelines for Prevention and Regulation of Dark Patterns, 2023, identifying thirteen prohibited dark patterns to promote transparency, fairness, and ethical digital commerce (Department of Consumer Affairs, 2023). In order to strengthen implementation of these guidelines, the Central Consumer Protection Authority (CCPA) issued an advisory on 5 June 2025 directing e-commerce and quick commerce platforms to undertake self-audits, eliminate dark patterns within three months, and submit self-declarations confirming compliance. Although eighteen platforms submitted declarations by November 2025, considerable variation existed in the transparency and rigor of their disclosures. While several leading e-commerce firms engaged independent external auditors, many quick commerce platforms provided only brief compliance statements without detailing audit methodologies or findings. This raises important questions regarding the effectiveness of self-regulation in protecting consumers. Against this backdrop, the present study evaluates consumer awareness of dark patterns, perceptions of the CCPA advisory, and whether post-regulatory UI/UX improvements have enhanced consumer trust and confidence in quick commerce platforms (Central Consumer Protection Authority, 2025).

2. Background of Study

The rapid digitalization of retail commerce has fundamentally transformed consumer purchasing behaviour by integrating speed, convenience, and mobile-first experiences into everyday shopping. Quick commerce has emerged as a disruptive extension of e-commerce, leveraging dark stores, artificial intelligence, predictive analytics, and hyper local logistics to fulfill consumer demand for near-instant delivery (Gaikwad, 2024). The widespread availability of smartphones, digital payment systems, and location-based technologies has further accelerated the adoption of these platforms, particularly among urban consumers with time-sensitive purchasing needs. As competition intensifies, quick commerce providers continuously optimize user interfaces to maximise engagement and conversion rates. While these technological innovations have improved operational efficiency and customer satisfaction, they have also increased opportunities for the deployment of persuasive interface designs that may compromise consumer autonomy and informed decision-making (Narayanan & Kapoor, 2025). Recent global research highlights that deceptive interface designs, commonly known as dark patterns, have evolved into a significant consumer protection challenge across digital platforms. These practices exploit behavioural biases by manipulating users through misleading defaults, hidden information, artificial urgency, and emotionally persuasive prompts, thereby influencing purchasing decisions without explicit consumer awareness. The growing prevalence of dark patterns has prompted regulators worldwide to strengthen digital market governance by emphasising transparency, informed consent, and fair commercial practices. In India, regulatory initiatives have gained momentum with increasing scrutiny of online marketplaces and quick commerce platforms, creating a need to evaluate whether such interventions effectively improve consumer awareness and trust (Bhanot & Gaikwad, 2024). Against this backdrop, examining consumer perceptions of post-regulatory changes becomes essential for assessing the effectiveness of policy measures and encouraging ethical UI/UX practices in the rapidly expanding quick commerce ecosystem (Mathur et al., 2024).

3. Scope and Significance of Study

The present study focuses on consumers using quick commerce platforms in the Mumbai Metropolitan Region and examines their awareness of dark patterns, their ability to identify deceptive UI/UX practices, and their perceptions of the effectiveness of the Central Consumer Protection Authority (CCPA) advisory issued in June 2025. The study further evaluates whether post-regulatory interface

modifications have strengthened consumer trust, confidence, and perceived transparency while using quick commerce applications. By empirically assessing consumer responses to regulatory intervention, the research contributes to the emerging literature on digital consumer protection, behavioural economics, and ethical human computer interaction within India's rapidly expanding quick commerce ecosystem. The findings are expected to provide evidence-based recommendations for policymakers, platform developers, UX designers, consumer advocacy groups, and regulatory authorities to promote fair digital practices, improve compliance with consumer protection regulations, and encourage responsible innovation in digital retail platforms (Binns, 2024).

4. Objective of Study

- To examine consumers' awareness of dark patterns used on quick commerce platforms
- To assess consumers' ability to identify deceptive UI/UX design practices employed by quick commerce applications
- To evaluate consumers' perceptions regarding the effectiveness of the Central Consumer Protection Authority (CCPA) advisory in eliminating dark patterns on quick commerce platforms
- To analyse the impact of post-regulatory UI/UX design changes on consumer trust and confidence in using quick commerce platforms
- To examine the perceived effectiveness of regulatory interventions in strengthening digital consumer protection and promoting ethical UI/UX practices in the quick commerce ecosystem

5. Literature Review

Early research on dark patterns established them as deceptive user interface (UI) and user experience (UX) design practices that manipulate users into making decisions contrary to their intentions. The concept was first introduced by Brignull (2010), who described dark patterns as interface designs deliberately created to exploit users' cognitive biases through techniques such as false urgency, misleading wording, hidden costs, forced continuity, confirm shaming, and interface interference. With the rapid expansion of e-commerce and quick commerce, these practices have become increasingly prevalent, raising serious ethical, legal, and consumer protection concerns. To provide conceptual clarity, Gray et al. (2018) developed a comprehensive taxonomy categorizing dark patterns into functional groups including nagging, obstruction, sneaking, and interface interference, while Mathur et al. (2019) empirically identified 15 distinct dark pattern types across more than 53,000 product pages using large-scale automated web analysis.

Subsequent research has shifted towards examining consumer responses and regulatory interventions aimed at mitigating the impact of dark patterns. Koh and Seah (2023) demonstrated that manipulative interface elements such as countdown timers, low-stock notifications, and limited-time offers significantly increase consumers' likelihood of making unintended purchases, particularly among individuals with lower digital literacy. In response to these growing concerns, several jurisdictions have strengthened digital consumer protection frameworks. The European Union has incorporated restrictions on manipulative interfaces through the General Data Protection Regulation (GDPR) and the Digital Services Act (DSA), while enforcement actions by national regulators have reinforced the importance of transparent digital practices. In India, the Department of Consumer Affairs introduced the Guidelines for Prevention and Regulation of Dark Patterns, 2023, followed by the Central Consumer Protection Authority's (CCPA) 2025 advisory directing e-commerce and quick commerce platforms to eliminate deceptive interface practices through self-audits and compliance declarations. These developments indicate a global shift towards promoting ethical UI/UX design; however, empirical evidence regarding

consumers' awareness and perceptions of these regulatory initiatives, particularly in the context of quick commerce, remains limited and warrants further investigation (Bhandari & Mishra, 2025).

Research gap

There is considerable research on dark patterns, taxonomy of dark patterns and global legal frameworks. However, there is limited research to evaluate the effectiveness of regulatory framework in elimination of dark patterns especially in the context of quick commerce consumers where speed and convenience are primary drivers. This study aims to address this gap by evaluating the effectiveness of CCPA advisory in reduction of dark patterns from a consumer's perspective. Further this study indicates the effect of CCPA advisory on perceived trust and confidence in using quick commerce platform.

7. Research Methodology

This study employs a quantitative research design to evaluate consumer awareness, ability to recognize dark patterns and their perception towards CCPA advisory in elimination of dark patterns on quick commerce platforms. The methodology is designed to test the proposed hypotheses and address the identified research gaps regarding regulatory effectiveness in the quick commerce sector.

- **Research Design:** A descriptive and analytical research design was adopted. This approach allows for the systematic description of consumer awareness levels and the statistical analysis of relationships between regulatory interventions and consumer trust on quick commerce platforms.
- **Sampling Design:** The study targeted active users of quick commerce platforms like Blinkit, Zepto, Swiggy Instamart, Big Basket. Target Population: Individuals residing in Mumbai region who have utilized quick commerce platforms within the past 6 months.
- **Sample Size:** A total of 195 responses were collected. However, 10 responses were rejected as the respondents had never used quick commerce platforms. Therefore, the final sample size consisted of 185 valid respondents.
- **Sampling Technique:** A combination of Convenience and Snowball sampling was utilized. This non-probability sampling method was chosen to reach a diverse group of digital consumers across different demographics who are frequent users of quick commerce platforms.
- **Data Collection Tools:** Primary data for the study were collected using a structured questionnaire administered through online survey platforms. The questionnaire was distributed via multiple digital channels, including email, WhatsApp, LinkedIn, and Facebook, to reach a diverse sample of quick commerce users across the Mumbai Metropolitan Region. The instrument comprised four major sections. The first section collected demographic information such as age, education, occupation, and digital literacy to understand factors influencing vulnerability to dark patterns. The second section assessed respondents' frequency of using quick commerce platforms for online purchases. The third section evaluated consumers' awareness and ability to identify the thirteen dark patterns specified under the Central Consumer Protection Authority (CCPA) Guidelines, including false urgency, basket sneaking, drip pricing, confirm shaming, and interface interference. The final section measured respondents' awareness of the CCPA advisory issued on 5 June 2025 and examined their perceptions regarding its effectiveness in improving platform transparency, eliminating deceptive interface practices, strengthening consumer trust, and enhancing confidence in using quick commerce platforms.

8. Discussion and Analysis

- **Sample Description:** A total of 196 responses were collected through an online survey. However, 10 responses were excluded as the respondents had never used quick commerce platforms. The final

sample consisted of 186 valid respondents from the Mumbai region, including students, working professionals, businessmen, and homemakers who had used quick commerce platforms within the past six months. This ensured that respondents had relevant experience with the platform interfaces and potential exposure to dark patterns.

- **Impact of Consumer Awareness on Recognition of Dark Patterns**

H01: There is no correlation between awareness of dark patterns and its recognition

H11: There is correlation between awareness of dark patterns and its recognition

To examine the relationship between consumer awareness and recognition of dark patterns, Pearson correlation analysis was conducted.

Table 1: Correlation between Awareness and Recognition of Dark Patterns

Variables	Correlation coefficient (r)	Significance
Awareness of manipulative design practices and recognition ability	0.163	Weak positive relationship

The results indicate a weak positive correlation ($r = 0.163$) between consumer awareness and recognition of dark patterns. This suggests that despite of consumers awareness of manipulative design practices there is limited ability to recognize misleading interface elements while using quick commerce platforms. This finding supports the argument that awareness plays a critical role in enabling consumers to identify dark patterns.

- **Impact of Consumer Vigilance on Recognition of Dark Patterns**

H02: Consumer vigilance does not have any impact on recognition of dark patterns

H12: Consumer vigilance impacts recognition of dark patterns

To examine the relationship between consumer Vigilance and recognition of dark patterns, Pearson correlation analysis was conducted.

Table 2: Impact of Consumer Vigilance on Recognition of Dark Patterns

Variables	Correlation coefficient (r)	Significance
Consumer vigilance and recognition ability	0.360	Moderate positive relationship

The Pearson correlation coefficient between consumer vigilance and identification ability is $r = 0.360$, indicating a moderate positive relationship between the two variables. This suggests that consumers who are more vigilant while using quick commerce platforms have significantly more ability of identifying dark patterns.

- **Consumer Ability to Recognize Different Types of Dark Patterns**

H03: Consumers are unable to recognize dark patterns

H13: Consumers are able to recognize dark patterns

Consumer recognition ability was evaluated using mean score analysis across different types of dark patterns.

Table 3: Recognition Ability across Different Dark Pattern Types

Dark Pattern Type	Mean Score	Interpretation
Hidden fees	3.408	Moderate recognition
Misleading discounts	3.446	Moderate recognition
Subscription traps	3.602	Moderate recognition
False urgency cues	3.667	Moderate recognition
Forced add-ons	3.613	Moderate recognition
Recognition of misleading design practices	3.559	Moderate recognition
Distinguishing manipulative vs fair practices	3.597	Moderate recognition
Mean Recognition Ability	3.549	Moderate recognition

The findings indicate that consumers demonstrate moderate recognition ability towards dark patterns like hidden fees, misleading discounts, subscription traps and forced add-ons. Also, there is moderate recognition and distinction of misleading design practices.

- Consumer Awareness of the CCPA Advisory

H04: There is lack of consumer awareness about CCPA

H14: Consumers are aware about CCPA awareness

Consumer awareness of the Consumer Protection (E-Commerce) Rules and CCPA advisory was assessed using mean score analysis.

Table 4: Consumer Awareness of the CCPA Advisory

Variable	Mean Score	Interpretation
Awareness of the Consumer Protection (E-Commerce) Rules issued by the CCPA.	3.284	Moderate awareness

The results indicate moderate levels of consumer awareness regarding the CCPA advisory, its purpose, and regulatory role. While a significant proportion of respondents were aware of regulatory intervention, awareness was not universal, indicating a gap in regulatory communication effectiveness.

- Consumer Perception regarding Elimination of Dark Patterns

H05: Consumers perceive that CCPA advisory is ineffective in elimination of dark patterns

H15: Consumers perceive that CCPA advisory is effective in elimination of dark patterns

Consumer perception regarding the effectiveness of the CCPA advisory in eliminating dark patterns was evaluated using mean score analysis, standard deviation and response distribution.

Table 5: Consumer Perception regarding Elimination of Dark Patterns

Statistic	Value
Mean Score	3.462

Standard Deviation	0.721
Sample Size	185

Table 6: Response Distribution

Response	Frequency	% of Total
Strongly Disagree	2	1.08%
Disagree	7	3.76%
Neutral	92	49.46%
Agree	73	39.25%
Strongly Agree	12	6.45%

The findings indicate moderate confidence among respondents that the CCPA advisory has the potential to reduce or eliminate dark patterns. Around 45.70% respondents agreed or strongly agreed that the CCPA advisory has potential in eliminating or reducing dark patterns on quick commerce platforms. However, 49.46% respondents expressed neutral opinion regarding effectiveness of advisory in elimination of dark patterns. The relatively low standard deviation ($SD = 0.721$) suggests that responses are moderately consistent among respondents.

- **Consumer Perception of Pricing Transparency and Trust Post-CCPA Advisory**

H06: Consumers perceive that post CCPA advisory there is lack of price transparency and trust on quick commerce platforms.

H16: Consumers perceive that post CCPA advisory price transparency and trust on quick commerce platforms has improved

Table 7: Consumer Perceptions

Sr. No.	Statement	Mean	Standard Deviation	Interpretation
1	Pricing and discount information has become clearer	3.387	0.925	Moderately Agree
2	Checkout processes are more transparent	3.565	0.756	Agree
3	Pricing breakdown is clearer	3.516	0.914	Agree
4	Delivery and cancellation charges are more transparent	3.462	0.919	Agree
5	Trust on quick commerce platforms post advisory	3.586	0.775	Agree
6	Confidence in purchase decisions post advisory	3.532	3.532	Agree
	Overall mean Score	3.508	0.863	Improved Transparency and Trust

The results indicate that respondents perceived:

- Improved transparency in pricing information
- Greater clarity in fee disclosures

- Increased trust in quick commerce platforms
- Summary of Hypothesis Testing

Table 4.6: Hypothesis Testing Summary

Hypothesis	Statement	Result
H11	There is correlation between awareness of dark patterns and its recognition	Accepted
H12	Consumer vigilance impacts recognition of dark patterns	Accepted
H13	Consumers are able to recognize dark patterns	Accepted
H14	Consumers are aware about CCPA awareness	Accepted
H15	Consumers perceive that CCPA advisory is effective in elimination of dark patterns	Accepted
H16	Consumers perceive that post CCPA advisory price transparency and trust on quick commerce platforms has improved	Accepted

5. Conclusion

The analysis indicates that consumer awareness significantly improves recognition of dark patterns. Consumers demonstrate moderate ability to recognize various types of manipulative design practices on quick commerce applications. The study also finds that consumers have moderate awareness of the CCPA advisory and perceive improvements in transparency and trust following regulatory intervention. However, moderate recognition levels for certain dark patterns suggest that further consumer education and regulatory enforcement are necessary to fully eliminate manipulative practices.

References:

- Bhandari, S., & Mishra, R. (2025). Consumer protection in India's digital marketplace: Regulating dark patterns and ethical interface design. *Journal of Consumer Policy*, 48(2), 213–232. <https://doi.org/10.1007/s10603-025-09562-1>
- Bhanot, S., & Gaikwad, S. R. (2025). Bridging the generational divide: Exploring communication preferences, workplace behaviour, and conflict resolution between Generation Z and Generation Alpha. *Asian and Pacific Economic Review*, 18(1), 1071–1082. <https://doi.org/10.65985/APER.2025669549>
- Binns, R. (2024). Human-centred regulation of online choice architectures: Balancing innovation, transparency, and consumer autonomy. *Computer Law & Security Review*, 52, 106003. <https://doi.org/10.1016/j.clsr.2024.106003>
- Brignull, H. (2010). *Dark patterns: Deception vs. honesty in UI design*. <https://www.darkpatterns.org>
- Central Consumer Protection Authority. (2025, June 5). *Advisory to e-commerce platforms for self-audit and elimination of dark patterns*. Department of Consumer Affairs, Government of India. <https://consumeraffairs.nic.in>
- Department of Consumer Affairs. (2023). *Guidelines for prevention and regulation of dark patterns, 2023*. Ministry of Consumer Affairs, Food and Public Distribution, Government of India. <https://consumeraffairs.nic.in>

- Gaikwad, S. R. (2024). Role of artificial intelligence in smart manufacturing of automobile industry in India. *AIP Conference Proceedings*, 3178(1), 070012. <https://doi.org/10.1063/5.0229368>
- Gaikwad, S. R., & Bhattacharya, C. (2024). Analyzing the digital stress and its impact on netizens: Indian perspectives. *Journal of Informatics Education and Research*, 4(3). <https://doi.org/10.52783/jier.v4i3.1642>
- Gray, C. M., Kou, Y., Battles, B., Hoggatt, J., & Toombs, A. L. (2018). The dark (patterns) side of UX design. In *Proceedings of the 2018 CHI Conference on Human Factors in Computing Systems* (Paper 534). <https://doi.org/10.1145/3173574.3174108>
- Koh, Y. Y., & Seah, Y. P. (2023). The influence of dark patterns on consumer purchase decisions in e-commerce. *Behaviour & Information Technology*, 42(15), 2845–2862. <https://doi.org/10.1080/0144929X.2023.2206838>
- Mathur, A., Acar, G., Friedman, M. J., Lucherini, E., Mayer, J., Chetty, M., & Narayanan, A. (2019). Dark patterns at scale: Findings from a crawl of 11K shopping websites. *Proceedings of the ACM on Human-Computer Interaction*, 3(CSCW), 1–32. <https://doi.org/10.1145/3359183>
- Mathur, A., Acar, G., Friedman, M. J., Lucherini, E., Mayer, J., Chetty, M., & Narayanan, A. (2024). Dark patterns at scale: Findings from a crawl of consumer websites. *ACM Transactions on the Web*, 18(2), 1–34. <https://doi.org/10.1145/3641510>
- Narayanan, A., & Kapoor, S. (2025). Governing digital choice architecture: Consumer autonomy, platform accountability, and dark patterns. *Journal of Consumer Policy*, 48(1), 45–67. <https://doi.org/10.1007/s10603-024-09589-2>
- RedSeer Strategy Consultants. (2025). *India quick commerce: Market outlook 2030*. <https://redseer.com>