
| RESEARCH ARTICLE

Dark Commercial Patterns and Consumer Behavior: A Conceptual Framework of Manipulation, Autonomy, and Trust

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| ABSTRACT

Digital interfaces increasingly shape how consumers search, consent, subscribe, purchase, disclose personal information, and terminate commercial relationships. Although interface design can simplify decision-making and improve convenience, it can also create dark commercial patterns—design practices that steer, pressure, obscure, or obstruct consumer choice in ways that may compromise informed and autonomous decision-making. This conceptual review examines dark commercial patterns from a psychological and behavioral perspective and develops an integrative framework explaining how such practices influence consumer responses. Drawing on research in persuasion knowledge, psychological reactance, perceived fairness, privacy, and consumer trust, the paper develops a five-category typology comprising information distortion, interface asymmetry, social and temporal pressure, choice obstruction, and forced action or data extraction. It then proposes a conversion–trust framework in which dark commercial patterns may generate immediate behavioral compliance while simultaneously increasing perceived manipulation and unfairness, threatening autonomy, and heightening privacy concern and perceived loss of control. These psychological responses can erode consumer trust and contribute to adverse downstream outcomes, including reduced purchase and renewal intentions, complaints, negative word-of-mouth, and churn. The framework further identifies decision risk, reversibility, consumer vulnerability, prior brand relationships, transparency, and choice symmetry as key boundary conditions. By integrating fragmented research on digital choice architecture with established theories of consumer judgment and behavior, the paper positions dark commercial patterns as a behavioral phenomenon characterized by a tension between short-term compliance and longer-term trust. It concludes with testable propositions, directions for future research, and practical implications for designing persuasive digital environments that preserve consumer autonomy and trust.

| KEYWORDS

dark commercial patterns; digital marketing; digital platform; consumer trust; online choice architecture; perceived manipulation; ethical design; corporate social responsibility

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1. Introduction

Digital marketing is no longer limited to advertising copy, brand messages, and promotional media. In many online environments, marketing is embedded in the architecture of consumer action itself. A retailer can decide when to disclose fees, which button is visually salient, whether the reject option is immediately visible, how many steps are required to cancel, whether a countdown timer appears at checkout, and whether privacy choices are symmetrical. These choices are not merely technical design decisions. They are market-facing decisions that shape acquisition, conversion, retention, data collection, and customer relationship outcomes.

This development creates a central tension for marketing management. Digital interfaces can reduce friction, simplify decisions, and make services easier to use. Yet the same tools can also be used to steer consumers toward decisions they may not have made under clearer, more balanced, or less effortful conditions. The term dark patterns was introduced in user-experience discourse to describe manipulative interface designs. Policy bodies increasingly use the phrase dark commercial patterns to

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emphasize that these practices often occur in commercial choice environments, including e-commerce, subscription services, digital advertising, mobile applications, and consent interfaces (Federal Trade Commission [FTC], 2022; Organization for Economic Co-operation and Development [OECD], 2022).

The empirical evidence indicates that dark commercial patterns are not isolated anomalies. In a large-scale crawl of approximately 11,000 shopping websites, Mathur et al. (2019) identified 1,818 instances of dark patterns across 15 types and seven broader categories. Consent-interface research similarly shows that cookie and data-consent notices often structure choices asymmetrically, making acceptance easier than refusal (Nouwens et al., 2020; Soe et al., 2020; Utz et al., 2019). Regulatory and consumer-protection agencies have documented disguised advertisements, hidden fees, difficult cancellation, misleading scarcity claims, and data-sharing tricks (FTC, 2022; OECD, 2022). More recent marketing studies have begun to examine consequences for purchase intention, perceived manipulation, perceived fairness, website attitude, and consumer reactance (Ju et al., 2026; Kim et al., 2023; Runge et al., 2023; Witte et al., 2025). Experimental evidence also suggests that dark patterns can materially change subscription decisions, while more aggressive designs may generate consumer backlash (Luguri & Strahilevitz, 2021).

Despite this growing attention, the marketing implications of dark commercial patterns remain undertheorized. Much of the early literature was developed in human-computer interaction, law, information systems, or consumer protection. These fields have made essential contributions by defining, classifying, and documenting deceptive interface practices (Gray et al., 2018; Gray et al., 2024; Mathur et al., 2019; Mathur et al., 2021). However, the marketing field has a distinct contribution to make: it can explain how dark commercial patterns affect consumer interpretation, brand trust, relationship quality, loyalty, complaint intention, and churn. This shift matters because a practice that improves a narrow conversion metric may still reduce customer lifetime value if consumers later perceive the interaction as manipulative, unfair, or privacy-invasive.

The present paper therefore asks: How do dark commercial patterns affect consumer trust and long-term marketing outcomes, and through which psychological mechanisms do these effects occur? To address this question, the paper develops an integrative conceptual review and proposes a conversion-trust framework. The framework argues that dark commercial patterns should be understood as a conversion-trust tradeoff: they may increase immediate behavioral compliance, but they risk eroding the perceived fairness, autonomy, and trust that sustain long-term customer relationships.

The paper makes four contributions. First, it translates technical and regulatory dark-pattern taxonomies into a marketing-oriented typology organized around five categories: information distortion, interface asymmetry, social and temporal pressure, choice obstruction, and forced action or data extraction. Second, it integrates theories of persuasion knowledge, reactance, fairness, privacy, and relationship marketing to identify the mechanisms through which dark commercial patterns affect consumer responses. Third, it offers testable propositions linking specific pattern categories to marketing outcomes. Fourth, it develops managerial implications for ethical digital marketing, arguing that firms should evaluate interface design not only through conversion rates but also through trust, complaint, refund, cancellation, and retention metrics.

2. Review Approach and Conceptual Positioning

This article is an integrative conceptual review rather than a systematic review or meta-analysis. A systematic review requires an exhaustive search protocol, inclusion and exclusion coding, and transparent database procedures. The purpose of the present paper is different: it synthesizes several literatures that have rarely been integrated in marketing and uses that synthesis to build a conceptual framework. This approach is appropriate when a phenomenon is emerging, conceptually fragmented, and studied across disciplinary boundaries (Snyder, 2019; Torraco, 2016). Conceptual articles can contribute by synthesizing theory, clarifying constructs, developing typologies, and building models that guide future empirical research (Jaakkola, 2020; MacInnis, 2011).

The review draws on six bodies of literature. The first is the human-computer interaction literature on dark patterns and deceptive design, which provides the strongest taxonomic foundation. The second is online choice architecture and digital nudging, which explains how the presentation of alternatives shapes decisions. The third is persuasion knowledge and psychological reactance, which explains how consumers respond when they perceive persuasion as manipulative or autonomy-threatening. The fourth is fairness and pricing research, which explains why hidden information and obstructive processes can damage perceived justice. The fifth is privacy research, which explains how data-related dark patterns reduce control and trust. The sixth is relationship marketing, which explains why trust is central to long-term exchange.

Because dark commercial patterns are also managerial systems of data capture, experimentation, and optimization, the review also considers adjacent management and analytics work when it helps clarify how firms convert data into action. This includes work on intellectual capital and AI-enabled organizational learning (Gapud et al., 2025), customer analytics and marketing optimization (Deldadehasl et al., 2025), and marketing-operations governance (Saghezchi et al., 2025). These streams are not substitutes for consumer-behavior theory, but they help situate dark commercial patterns within the broader managerial logic of digital optimization.

Table 1. Literature streams informing the conceptual review

Literature stream	Representative sources	Conceptual role in this paper
Dark patterns and deceptive design	Gray et al. (2018); Gray et al. (2024); Mathur et al. (2019); Mathur et al. (2021)	Defines dark patterns, identifies design attributes, and provides a base taxonomy for commercial interfaces.
Online choice architecture and digital nudging	Johnson et al. (2012); Weinmann et al. (2016); Competition and Markets Authority (2022)	Explains how the structure and presentation of alternatives influence consumer decisions.
Persuasion knowledge and reactance	Brehm (1966); Campbell and Kirmani (2000); Clee and Wicklund (1980); Friestad and Wright (1994); Steindl et al. (2015)	Explains why perceived manipulation and autonomy threat can trigger resistance and negative evaluations.
Fairness and pricing	Morwitz et al. (1998); Xia et al. (2004); Kim et al. (2023); Witte et al. (2025)	Explains why hidden costs, misleading scarcity, and obstructive processes damage perceived fairness and attitudes.
Privacy and data control	Acquisti et al. (2015); Culnan and Armstrong (1999); Malhotra et al. (2004); Martin et al. (2017); Nezhad et al. (2026)	Explains how privacy-invasive designs reduce perceived control, increase privacy concern, and undermine trust.
Relationship marketing and consumer trust	Morgan and Hunt (1994); Sirdeshmukh et al. (2002)	Positions dark commercial patterns as threats to loyalty, relationship quality, and customer equity.

The paper prioritizes peer-reviewed academic publications, major conference proceedings in human-computer interaction, and official reports from consumer-protection institutions. Foundational sources are included where they remain theoretically central, such as persuasion knowledge, psychological reactance, and relationship marketing. Recent sources are emphasized where the empirical phenomenon is rapidly changing, especially in research on consent interfaces, online retailing, digital regulation, AI-supported privacy tools, and digital marketing operations.

3. Conceptual Background: From Choice Architecture to Dark Commercial Patterns

A central challenge in this domain is distinguishing persuasive design from manipulative design. All marketing interfaces influence choice. Product rankings, default options, button placement, checkout flows, and recommendation systems inevitably shape consumer attention and action. The mere fact that design affects behavior does not make it dark. Online choice architecture refers more broadly to the digital environment in which users act and make decisions, including how alternatives are presented, organized, and made actionable (Competition and Markets Authority, 2022). Digital nudging similarly examines how interface design can guide behavior in digital choice environments (Weinmann et al., 2016).

Dark commercial patterns represent a narrower and more problematic subset of choice architecture. They are commercial design practices that steer, deceive, pressure, or obstruct consumers in ways that impair informed and autonomous choice. The OECD (2022) emphasizes that these practices can subvert consumer decision-making by altering how choices are presented. Mathur et al. (2021) argue that evaluating whether a design is dark requires attention to design attributes, normative considerations, and measurement. These concerns are also consistent with broader accounts of digital market manipulation and autonomy in technology-mediated environments (Calo, 2014; Susser et al., 2019).

This distinction is central to marketing. A persuasive interface becomes problematic not merely because it is effective, but because it secures compliance by weakening comprehension, autonomy, transparency, or reversibility. A recommender that highlights relevant options may help consumers. A recommender that hides lower-priced alternatives, obscures sponsored placement, or makes refusal difficult undermines the conditions under which persuasion remains legitimate.

This paper uses the term dark commercial patterns to emphasize the marketing context in which the practices occur. The commercial setting is important because firms often have measurable incentives to optimize conversion, data capture, retention, and transaction completion. A design can therefore be evaluated along two dimensions: whether it advances the firm's immediate objectives and whether it preserves the consumer's ability to make an informed, preference-consistent choice. Ethical digital marketing aims to persuade while preserving this second condition. Dark commercial patterns violate it.

4. A Marketing-Oriented Typology of Dark Commercial Patterns

Existing taxonomies are valuable but often framed for design, legal analysis, or technical detection. Marketing scholars and managers need a typology that connects interface tactics to consumer interpretation and relationship outcomes. Table 2

proposes five categories: information distortion, interface asymmetry, social and temporal pressure, choice obstruction, and forced action or data extraction. These categories synthesize prior taxonomic work while focusing on the consumer-facing marketing journey.

Table 2. Marketing-oriented typology of dark commercial patterns

Category	Typical interface examples	Primary consumer interpretation	Likely short-term firm effect	Likely relationship risk
Information distortion	Hidden fees; buried subscription terms; disguised ads; unclear renewal language; misleading pre-checked charges	The firm is withholding or distorting material information.	Higher checkout completion or add-on acceptance.	Lower perceived fairness, regret, complaints, and distrust.
Interface asymmetry	Accept button more salient than reject button; cancellation option hidden; opt-in path easier than opt-out path	The firm designed unequal choice paths.	Higher consent, subscription, or retention.	Perceived manipulation, autonomy threat, and reduced trust.
Social and temporal pressure	Countdown timers; low-stock warnings; popularity claims; activity messages; limited-time prompts	The firm is creating urgency or social pressure.	Higher impulse purchase or faster decision.	Decision regret, skepticism, and lower attitude if claims seem false or exaggerated.
Choice obstruction	Hard-to-cancel subscriptions; long unsubscribe flows; confusing return processes; repeated confirmation screens	The firm is making preference reversal unnecessarily difficult.	Lower immediate churn and fewer completed cancellations.	Reactance, anger, negative word-of-mouth, and regulatory risk.
Forced action and data extraction	Forced account creation; consent walls; privacy-invasive defaults; unnecessary data fields	The firm prioritizes data capture over consumer welfare.	More first-party data, account creation, and tracking consent.	Privacy concern, loss of control, and lower perceived benevolence.

The first category, information distortion, includes tactics that obscure, delay, or misrepresent material information. Drip pricing and partitioned pricing are conceptually relevant because separating the base price from mandatory fees can reduce consumers' recalled total cost and change demand (Morwitz et al., 1998). Dark commercial patterns extend this logic when information is not merely partitioned but strategically buried, disguised, or revealed late enough to exploit sunk effort. Witte et al. (2025) provide recent marketing evidence that scarcity and sneaking patterns can influence perceived violations of communication maxims and perceived manipulation.

The second category, interface asymmetry, refers to unequal design of options that should be substantively equivalent from the consumer's perspective. Examples include a prominent accept button paired with a hidden reject link, a one-click sign-up paired with a multi-step cancellation process, or visual hierarchy that makes one option appear recommended when it mainly benefits the firm. Consent-banner studies show that small interface changes can meaningfully affect acceptance rates (Nouwens et al., 2020; Utz et al., 2019).

The third category, social and temporal pressure, includes scarcity, urgency, and social-proof cues. Scarcity appeals can be legitimate when they communicate accurate availability, and scarcity messages have long been studied in advertising and promotion (Aggarwal et al., 2011). They become dark when claims are false, exaggerated, unverifiable, or designed to shorten deliberation without informing the consumer. Koh and Seah (2023) find that common e-commerce dark patterns such as low-stock and limited-time messages can affect product selection.

The fourth category, choice obstruction, captures the deliberate addition of friction to actions that reduce firm revenue or data access. Runge et al. (2023) argue that online services may hide cancellation options, impose excessive steps, or prevent immediate exit. Sunstein (2022) describes similar unnecessary friction as sludge: costly administrative burdens that make action more difficult. From a marketing perspective, obstruction is especially important because it may reduce measured churn while increasing hidden dissatisfaction.

The fifth category, forced action and data extraction, includes designs that make access conditional on unnecessary account creation, excessive data disclosure, or confusing privacy consent. These practices connect dark-pattern research with marketing privacy scholarship. Consumers often struggle to evaluate data flows, and privacy preferences are context-dependent and malleable (Acquisti et al., 2015). When a firm designs data choices to privilege disclosure over control, consumers may infer that the firm lacks benevolence and integrity.

5. Consumer Interpretation Mechanisms

Dark commercial patterns do not affect marketing outcomes only by changing immediate behavior. They also affect how consumers interpret the firm. This paper proposes four mechanisms: perceived manipulation, perceived unfairness, autonomy threat, and privacy concern. These mechanisms translate interface tactics into downstream relationship outcomes.

5.1 Perceived Manipulation and Persuasion Knowledge

The Persuasion Knowledge Model argues that consumers develop knowledge about marketers' motives, tactics, and persuasion attempts, and they use this knowledge to cope with marketing influence (Friestad & Wright, 1994). When persuasion motives become salient, consumers may reinterpret the agent's behavior as self-interested or manipulative (Campbell & Kirmani, 2000). Dark commercial patterns are likely to activate this process because they reveal, or later make consumers infer, that the firm designed the interaction to secure compliance rather than help the consumer choose well.

Perceived manipulation is especially likely when consumers identify information distortion or interface asymmetry. A hidden fee suggests that the firm did not want consumers to evaluate the full cost at the beginning of the decision. A visually dominant accept button paired with a hidden reject option suggests that the firm is steering rather than informing. Recent marketing evidence supports this pathway: Witte et al. (2025) show that scarcity and sneaking patterns can be associated with perceived customer manipulation, which in turn is negatively associated with purchase intention and website attitude.

Proposition 1: Information distortion and interface asymmetry are positively associated with perceived manipulation.

Proposition 2: Perceived manipulation negatively affects brand attitude, website attitude, and purchase or subscription intention.

5.2 Perceived Unfairness

Dark commercial patterns can also damage perceived fairness. Fairness judgments are central to consumer response because consumers evaluate not only outcomes but also the processes through which outcomes are obtained. Price fairness research shows that consumers react negatively when they perceive prices or pricing processes as unreasonable or unjustified (Xia et al., 2004). Service and tourism research similarly suggests that unfair processes can damage attitudes toward firms. Kim et al. (2023), for example, find that dark-pattern tactics in online travel agency contexts influence perceived fairness and attitudes.

Information distortion and choice obstruction are particularly likely to affect fairness. Hidden fees violate expectations about transparent pricing. Obstructive cancellation violates expectations about reciprocal exchange: the firm made entry easy but exit difficult. Even if these practices are formally disclosed in terms and conditions, consumers may still perceive them as unfair if disclosure is not timely, salient, or usable.

Proposition 3: Information distortion and choice obstruction are positively associated with perceived unfairness.

Proposition 4: Perceived unfairness reduces consumer trust and increases complaint intention, refund seeking, and negative word-of-mouth.

5.3 Autonomy Threat and Psychological Reactance

Psychological reactance theory argues that people respond negatively when they perceive that their freedom of choice has been threatened or eliminated (Brehm, 1966; Clee & Wicklund, 1980; Steindl et al., 2015). Dark commercial patterns can trigger reactance because they make consumers feel that the firm is narrowing, concealing, or burdening their ability to express preferences. Choice obstruction, forced continuity, and asymmetric opt-out procedures are especially relevant. They communicate that consumers may enter a relationship easily, but they cannot exit, decline, or reverse the decision with equal ease.

Reactance is important for marketing because it can convert an otherwise mundane service interaction into an antagonistic relationship. A consumer who cannot easily cancel a subscription may continue paying temporarily, which improves a retention metric. Yet the same consumer may also become angry, distrustful, and more likely to complain publicly. In data-consent settings, Ju et al. (2025) find that ambiguous consent language and limited choice can heighten privacy threat, reduce perceived control, activate persuasion knowledge, and produce reactance. This evidence suggests that the autonomy mechanism is central to understanding dark commercial patterns in digital advertising and privacy contexts.

Proposition 5: Choice obstruction and forced action are positively associated with autonomy threat and psychological reactance; this relationship is weaker when refusal, cancellation, or reversal is as easy as acceptance, subscription, or enrollment.

5.4 Privacy Concern and Loss of Control

Data-related dark commercial patterns connect directly to privacy scholarship. Privacy concerns include consumers' perceptions of data collection, control, and awareness of privacy practices (Malhotra et al., 2004). Procedural fairness and impersonal trust matter because consumers may accept organizational data use when they believe procedures are fair and trustworthy (Culnan & Armstrong, 1999). Marketing research further shows that transparency and control can reduce negative responses to data vulnerability, while perceptions of data access can increase violation perceptions and reduce trust (Martin et al., 2017; Martin & Murphy, 2017).

Forced action and data extraction patterns are therefore not merely privacy issues. They are trust signals. A firm that makes tracking refusal difficult or conditions access on unnecessary data disclosure communicates something about its priorities. Consumers may infer that the firm values data capture more than consumer autonomy, which lowers perceived benevolence. Recent HCI work on chatbot privacy similarly emphasizes that meaningful agency requires interface tools that make privacy risks visible and actionable during use rather than after disclosure has already occurred (Nezhad et al., 2026).

Proposition 6: Forced action and data-extraction patterns increase privacy concern and perceived loss of control, which in turn reduce consumer trust.

5.5 Trust Erosion and the Conversion-Trust Tradeoff

Relationship marketing theory treats trust as a central condition for successful long-term exchange (Morgan & Hunt, 1994). Trust helps convert perceived value into loyalty and reduces relational uncertainty (Sirdeshmukh et al., 2002). Dark commercial patterns threaten this foundation because they can change what consumers believe about the firm. A consumer who encounters a hidden fee, misleading countdown, or obstructive cancellation process may conclude that the firm is opportunistic. This interpretation can persist beyond the immediate transaction.

This paper therefore proposes the conversion-trust tradeoff. Dark commercial patterns may increase immediate conversion by exploiting attention limits, defaults, urgency, or friction. However, when consumers recognize or infer the tactic, the same pattern can reduce trust and damage long-term relationship outcomes. The tradeoff is not automatic; some consumers may not notice the pattern, and some decisions may be low enough in importance that trust effects are minimal. Nevertheless, the strategic risk is that short-term behavioral compliance masks long-term customer equity loss.

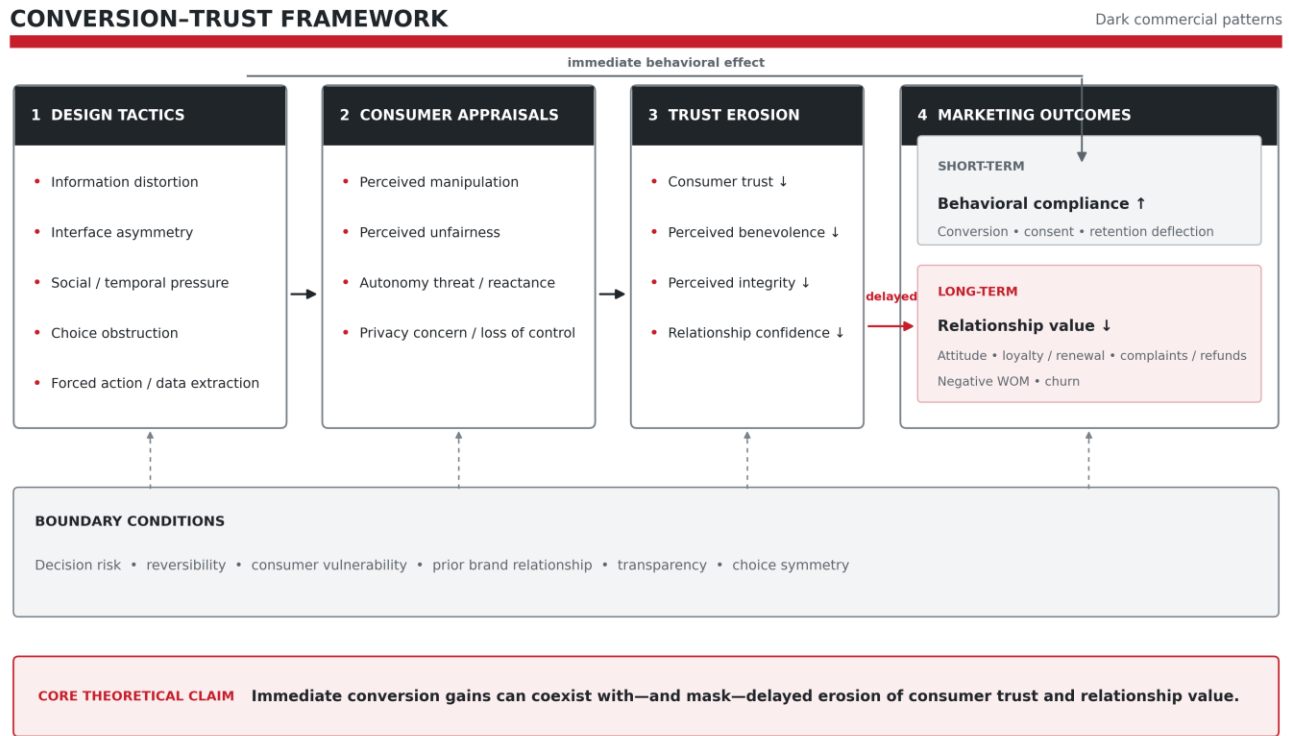
Proposition 7: Consumer trust mediates the negative relationship between dark commercial patterns and long-term marketing outcomes, including loyalty intention, repurchase intention, subscription renewal, complaint intention, and churn intention.

Proposition 8: The negative effects of dark commercial patterns on trust are stronger when decisions are high-risk, personally sensitive, difficult to reverse, or experienced by consumers with situational or structural vulnerability.

6. Conceptual Framework

Figure 1 summarizes the proposed framework. The model begins with five categories of dark commercial patterns, which generate consumer appraisals and erode consumer trust. The outcome panel distinguishes the immediate behavioral effects of dark commercial patterns from their delayed relationship consequences. Boundary conditions moderate the strength of these pathways.

Figure 1. Conversion-trust framework of dark commercial patterns



Note. The upper pathway represents immediate behavioral effects; the trust pathway represents delayed relational consequences. Dashed arrows indicate moderation by boundary conditions.

The framework is intended to guide empirical research rather than replace it. Researchers can test specific elements using experiments, field data, surveys, or platform analytics. For example, an experiment could manipulate whether fees are disclosed early or late and measure perceived manipulation, perceived fairness, trust, and purchase intention. A field study could examine whether simplifying cancellation reduces short-term retention but improves complaint rates and long-term reactivation. A survey could measure consumer recognition of dark commercial patterns and link it to trust in specific online retailers or subscription services.

The framework is also useful for managerial measurement. It suggests that firms should not treat conversion as the only dependent variable. A one-click consent increase is meaningful only if the same interface does not also increase later complaints, refund requests, customer support contacts, chargebacks, review negativity, or churn. The marketing problem is therefore temporal and relational: the gain may appear immediately, while the loss may be distributed across later relationship episodes.

Table 3. Propositions and possible empirical tests

Proposition	Theoretical logic	Possible empirical test
P1	Information distortion and interface asymmetry activate persuasion knowledge and perceived manipulation.	Scenario experiment manipulating hidden fees or button symmetry.
P2	Perceived manipulation lowers attitudes and purchase/subscription intentions.	Mediation analysis using experimental or survey data.
P3	Information distortion and obstruction violate perceived procedural and price fairness.	Checkout or cancellation-flow experiment.
P4	Unfairness reduces trust and increases complaint-related outcomes.	Survey linking recalled dark patterns to complaint intention and negative word-of-mouth.
P5	Obstruction and forced action threaten autonomy and trigger reactance.	Subscription cancellation experiment varying number of steps and availability of immediate cancellation.

Proposition	Theoretical logic	Possible empirical test
P6	Data-extraction patterns heighten privacy concern and loss of perceived control.	Consent-banner experiment varying choice symmetry, data explanation, and reject-path effort.
P7	Trust mediates the long-term effect of dark patterns on relationship outcomes.	Longitudinal panel or field experiment tracking trust, churn, and reactivation.
P8	Effects are stronger under higher risk, low reversibility, sensitivity, or vulnerability.	Moderated experiment varying decision risk and measuring consumer vulnerability indicators.

7. Discussion

The central argument of this paper is that dark commercial patterns should be understood as a marketing problem. This reframing matters because dark-pattern scholarship has often emphasized interface taxonomies, legal compliance, or consumer protection. These perspectives are essential, but they do not fully explain the firm-level marketing consequences of manipulative digital design. A marketing perspective highlights that dark commercial patterns can damage the very relational assets that firms seek to build: trust, loyalty, willingness to share data, willingness to renew subscriptions, and willingness to recommend.

This reframing also challenges a narrow interpretation of performance optimization. Digital firms often test interface changes through immediate behavioral metrics, such as click-through rate, checkout completion, consent rate, account creation, or cancellation deflection. These metrics are useful but incomplete. A design that increases immediate consent may still reduce trust if consumers later feel tricked. A cancellation flow that reduces completed cancellations may still increase anger, chargebacks, complaints, and reputational risk. A scarcity message that accelerates purchase may still create regret if consumers later infer that the urgency claim was misleading.

The conversion-trust framework therefore encourages marketing researchers to study dark commercial patterns as temporal phenomena. The immediate behavioral effect and the delayed relational effect may move in opposite directions. This creates a measurement problem: managers may observe the conversion gain quickly but fail to observe the trust loss until later. The firm may also misattribute later churn or negative word-of-mouth to product dissatisfaction rather than to manipulative interaction design. Future research should therefore examine lagged consequences, cumulative exposure, and how consumers update firm beliefs after recognizing a dark commercial pattern.

The framework also helps distinguish legitimate persuasion from dark persuasion. Persuasive marketing can create urgency, highlight social proof, simplify choices, and recommend options. These practices are not inherently unethical. They become dark when they rely on deception, hidden information, unequal choice paths, unnecessary friction, or pressure that undermines consumer autonomy. Ethical design is therefore not anti-conversion. It is conversion pursued within boundaries of clarity, symmetry, reversibility, and respect for consumer control.

8. Managerial Implications

A key managerial implication is that digital marketing teams should evaluate customer journeys with both conversion metrics and trust metrics. The following audit principles translate the framework into practice.

Audit information clarity. Material terms should be visible before commitment. Fees, renewal dates, cancellation conditions, data uses, and add-on charges should be disclosed at the time when consumers can still use the information. Disclosure buried in terms and conditions is unlikely to protect trust if consumers perceive the firm as intentionally hiding information.

Audit choice symmetry. Declining, rejecting, cancelling, unsubscribing, and deleting should be comparable in visibility and effort to accepting, subscribing, enrolling, and consenting. Symmetry does not require that every option look identical. It requires that the firm not create artificial asymmetry to produce a preferred outcome.

Audit reversibility. The harder a decision is to reverse, the stronger the ethical obligation to support comprehension and deliberation. High-risk, high-cost, recurring, data-sensitive, or identity-sensitive decisions require greater transparency than low-stakes choices.

Audit data respect. Firms should separate necessary data from optional data, explain data use in understandable language, and avoid making refusal unnecessarily difficult. Privacy choice should be treated as part of the brand relationship, not merely as a legal requirement.

Audit post-interaction outcomes. Firms should monitor complaint rates, refund requests, chargebacks, cancellation attempts, negative reviews, and customer support sentiment after interface changes. These outcomes can reveal trust damage that is invisible in immediate conversion data. App-review prioritization research illustrates how text analytics can help firms identify which user complaints deserve rapid managerial attention (Jafari et al., 2024). Customer clustering and decision-support

approaches in hospitality likewise show how behavioral and transactional data can be translated into segment-specific marketing decisions (Deldadehasl et al., 2025).

Govern ethical optimization. Interface governance should include cross-functional review across marketing, design, legal, analytics, and customer support. Marketing-operations research suggests that campaign governance can benefit from structured coordination between decision makers and operational agents (Saghezchi et al., 2025), while resource-allocation models in scale-ups highlight that optimization choices should be evaluated against strategic constraints rather than single short-term objectives (Saghezchi et al., 2024). Applied to dark commercial patterns, this means that a successful test should not be defined only by conversion lift; it should also pass a trust-risk review.

Adopt a fair-persuasion standard. Fair persuasion seeks to influence consumers while preserving their ability to understand, compare, refuse, and reverse. This standard allows marketing teams to remain commercially effective while avoiding practices that consumers interpret as manipulative.

9. Future Research Agenda

The proposed framework suggests several research opportunities. First, marketing researchers should compare the short-term and long-term effects of dark commercial patterns. Existing studies often measure immediate choice, attitude, or intention. Future work can examine whether dark patterns increase immediate compliance but reduce renewal, cross-buying, or recommendation over time. Second, researchers should test pattern-specific effects. Different patterns are unlikely to operate through identical mechanisms. Hidden fees may primarily affect fairness; forced data disclosure may primarily affect privacy concerns; obstructive cancellation may primarily trigger reactance; and misleading scarcity may primarily affect perceived manipulation and regret. Pattern-level research would help managers understand which practices are most damaging and under what conditions.

Third, research should examine recognition and timing. Some consumers may not notice a dark commercial pattern until after purchase, when they receive a bill, attempt cancellation, or learn that scarcity claims were misleading. The timing of recognition may moderate whether consumers blame themselves, the interface, or the firm. More research is also needed on consumer vulnerability. Rossi et al. (2024) argue that vulnerability to deceptive design is multidimensional and cannot be reduced to fixed demographic categories. Situational factors such as time pressure, financial stress, low digital literacy, low language fluency, and decision fatigue may make many consumers temporarily vulnerable. Marketing research can contribute by identifying how vulnerability interacts with interface design and product category.

Fourth, future research should examine artificial intelligence and personalization. Dark commercial patterns may become more powerful when firms can personalize pressure, friction, and disclosure timing based on individual behavior. AI-enabled optimization could identify which consumers are most likely to respond to scarcity, which are least likely to notice hidden fees, or which are least likely to complete a cancellation flow. This raises new questions about fairness, discrimination, and accountability in personalized choice architecture. The wider management literature on interpretable machine learning, investor sentiment, and predictive decision systems suggests that model transparency and behavioral feedback are central challenges in data-intensive decision environments (Mashhadi et al., 2025; Mojtahedi et al., 2025). Methodological work outside marketing further demonstrates how neural networks can recover latent structures from complex observed signals (Ghanaatian et al., 2026). As a cross-domain analogy, similar inverse-modeling logic could be used to infer latent susceptibility to particular interface tactics from behavioral traces, provided that interpretability, consent, and fairness are built into the research design.

Fifth, researchers should develop richer measurement systems for ethical digital design. Adjacent analytics domains show that monitoring systems can integrate sensor data, survey data, and decision models to detect operational risks (Calderon et al., 2025; Moradi et al., 2025). Although smart infrastructure differs from digital marketing, the measurement logic is instructive: firms need dashboards that detect hidden deterioration before failure becomes visible. In digital marketing, analogous indicators might include complaint sentiment, refund escalation, cancellation frustration, consent reversals, and post-purchase regret.

Sixth, future work can connect dark commercial patterns to operations research and adaptive decision-making. Research on active inference for energy-efficient control, quantile Fourier regressions for decision making under uncertainty, and electricity price-aware scheduling illustrates how dynamic systems can optimize under uncertainty while explicitly modeling future costs (Khojaste, Pearce, et al., 2025; Khojaste, Pritchard, & Zakeri, 2025; Taheri Yeganeh et al., 2025). Marketing researchers can adapt this logic by modeling dark-pattern decisions as dynamic policies with delayed trust costs rather than one-shot A/B tests.

Lastly, researchers should examine trust repair. If consumers detect a dark commercial pattern, can the firm repair trust through apology, refund, redesign, or disclosure? Service recovery research suggests that procedural and interactional fairness may matter after failure, but more work is needed on recovery from manipulative interface design. Research on AI-enabled privacy learning also suggests that just-in-time tools can help consumers develop more actionable privacy awareness during interaction (Nezhad et al., 2026). Similar interventions may help firms move from dark design toward transparent, consumer-supportive choice architecture.

Table 4. Future research questions

Research area	Example question	Suggested design
Short-term versus long-term outcomes	Do dark patterns increase immediate conversion while reducing renewal or loyalty?	Longitudinal field experiment or panel study.
Pattern-specific mechanisms	Do hidden fees, fake urgency, and cancellation obstruction operate through different mechanisms?	Multi-cell experiment comparing pattern categories.
Recognition and timing	Does delayed recognition create stronger negative reactions than immediate recognition?	Two-stage experiment with post-purchase feedback.
Consumer vulnerability	Which situational and structural vulnerabilities intensify harm?	Moderated experiment measuring stress, time pressure, digital literacy, or language fluency.
AI personalization	Can personalized dark patterns create unequal exposure to manipulation?	Audit study or simulation using personalized interface variants.
Ethical analytics dashboards	Which lagged metrics reveal trust deterioration after conversion optimization?	Field dashboard combining support logs, reviews, refund requests, and retention data.
Trust repair	Can redesign, refund, apology, or disclosure repair trust after consumers detect manipulation?	Service-recovery experiment.

10. Limitations

This paper has limitations. First, it is conceptual and integrative; it does not provide new empirical data. The propositions should therefore be treated as theoretically grounded claims requiring empirical testing. Second, the typology simplifies a complex and evolving design landscape. Some practices may fit multiple categories, and future technologies may generate new forms of dark commercial patterns. Third, regulatory definitions are still evolving across jurisdictions. The paper therefore focuses on consumer interpretation and marketing outcomes rather than legal classification.

Fourth, the review is not a formal systematic review; it synthesizes influential, recent, and theoretically relevant work but does not claim exhaustive coverage of every publication on deceptive design. Fifth, several managerial-analytics sources are included to broaden the management relevance of the paper, but the paper's core theoretical claims remain grounded in consumer behavior, privacy, fairness, and relationship marketing research. Future empirical work should test whether the conversion-trust framework generalizes across industries, cultures, devices, and consumer segments.

11. Conclusion

Digital marketers increasingly design not only messages but also the environments in which consumers make decisions. This gives firms substantial power over attention, comprehension, consent, purchase, subscription, and exit. Dark commercial patterns emerge when that power is used to obscure information, create artificial pressure, burden refusal, extract data, or make consumer preferences harder to express.

This paper has argued that dark commercial patterns should be understood as a marketing trust problem. They can improve immediate behavioral compliance, but they may also damage perceived manipulation, fairness, autonomy, privacy, and trust. The proposed conversion-trust framework highlights a strategic risk: firms that optimize only for short-term conversion may erode the relationship assets that sustain long-term value. Ethical digital marketing should therefore aim to persuade without deceiving, guide without coercing, and convert without undermining trust.

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