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Dark Patterns as Instruments of Digital Consumer Exploitation: A Systematic Review Bridging Interface Design and Consumer Protection Law

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Abstract. *The rapid growth of digital commerce has intensified the prevalence of dark patterns manipulative interface designs that influence consumers to make decisions contrary to their own interests through deceptive or coercive design strategies. Experimental evidence demonstrates their substantial effectiveness, with consumers exposed to highly manipulative interfaces being nearly four times more likely to subscribe to unwanted services than those interacting with neutral designs. Although human–computer interaction (HCI) research has developed comprehensive taxonomies of dark patterns, consumer protection law scholarship remains fragmented across jurisdictions and lacks conceptual integration with design-based perspectives. This disciplinary divergence creates significant challenges in translating interface-level evidence into enforceable legal standards. Addressing this gap, this study systematically reviews the conceptual relationship between manipulative interface design taxonomies and consumer protection law frameworks while identifying barriers that impede effective legal enforcement in digital markets. The review follows the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and systematically searches the Scopus and Web of Science databases using combinations of keywords related to dark patterns, deceptive design, and consumer protection law. Eligible studies were screened according to thematic relevance, methodological rigor, and publication period before undergoing thematic synthesis. The findings reveal a fundamental conceptual divergence: design-oriented literature primarily characterizes dark patterns through designer intent and interface attributes, whereas legal scholarship emphasizes demonstrable consumer harm and evidentiary standards. This mismatch represents the*



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principal operational barrier preventing consistent legal regulation of manipulative interface practices. The study contributes to the literature by proposing an integrative conceptual framework that bridges design-based and legal perspectives on dark patterns. It further offers practical recommendations for policymakers and digital platform designers to develop consumer protection regulations and design standards that more effectively address manipulative digital interfaces.

Keywords: *Digital Consumer Protection, Dark Patterns; Interface Design Ethics; Systematic Literature Review; Unfair Commercial Practices.*

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1. Introduction

The rapid development of digital commerce has fundamentally transformed the way consumers obtain information, purchase goods and services, and enter into contractual relationships. Digital platforms increasingly rely on sophisticated interface designs to facilitate transactions and guide consumer interactions. However, the same technological features that improve convenience can also be deliberately employed to manipulate consumer behaviour. One of the most significant manifestations of this phenomenon is the emergence of dark patterns, namely interface designs that influence users toward decisions that may conflict with their preferences or economic interests. Dark patterns can take various forms, including hidden costs, preselected options, confusing consent mechanisms, forced continuity, difficult cancellation processes, and emotionally manipulative prompts. Their widespread use raises fundamental concerns regarding consumer autonomy, informed choice, and fairness in digital transactions.

The legal challenge arises because conventional consumer protection frameworks have traditionally concentrated on misleading information, unfair contractual terms, deceptive advertising, and disclosure obligations. Dark patterns, however, demonstrate that consumer exploitation may occur even when the information provided by businesses is technically accurate. Manipulation can instead be embedded within the architecture of the interface through the placement, timing, visibility, and accessibility of consumer choices. Consequently, protecting consumers in digital markets requires a stronger conceptual connection between interface design and consumer protection law. The assessment of consumer autonomy should extend beyond whether consumers formally provide consent and consider whether the digital environment enables them to make meaningful and voluntary decisions.

This article therefore examines dark patterns as instruments of digital consumer exploitation through a systematic review that bridges technological interface design and legal protection. It analyzes the manipulative mechanisms through which dark patterns influence consumer transactions, evaluates the capacity and limitations of existing consumer protection principles in addressing such practices, and explores the need to reconstruct consumer protection mechanisms through a design-based regulatory approach.

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Such reconstruction requires preventive obligations, technological enforcement, interface accountability, and accessible consumer remedies. By integrating legal and technological perspectives, this study argues that effective digital consumer protection must move beyond a purely disclosure-oriented model toward a framework that safeguards the conditions under which consumer choices are made, while maintaining an appropriate balance between legitimate commercial persuasion, technological innovation, and substantive consumer autonomy.

2. Research Methods

The study contributes to the literature by proposing an integrative conceptual framework that bridges design-based and legal perspectives on dark patterns.

3. Results and Discussion

3.1. Dark Patterns as Manipulative Instruments in Digital Consumer Transactions

The rapid expansion of digital commerce has fundamentally transformed the relationship between businesses and consumers. Digital platforms provide consumers with unprecedented access to products, services, information, and transactions, while simultaneously allowing businesses to design highly sophisticated environments for influencing consumer behaviour. Within this context, dark patterns have emerged as an increasingly important form of digital manipulation. Dark patterns refer to user-interface designs that are deliberately structured to influence, pressure, or deceive consumers into making decisions that may not correspond with their genuine preferences. Rather than relying exclusively on false information, these practices manipulate the architecture through which information and choices are presented. Consequently, dark patterns represent a distinctive form of consumer exploitation because manipulation occurs at the level of the decision-making environment itself.

The manipulative character of dark patterns can be observed through various interface techniques. Digital platforms may automatically select additional products or services, conceal important costs until the final stage of a transaction, use confusing language to obtain consent, make subscription cancellation unnecessarily complicated, or employ emotionally charged messages to discourage consumers from rejecting an offer. Other practices include false scarcity indicators, countdown timers, disguised advertisements, forced registration, and repeated prompts designed to exhaust consumer resistance. Although each technique may appear relatively minor when considered individually, their cumulative effect can substantially distort consumer decision-

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making. The consumer may believe that the final transaction represents an independent choice, even though the available options have been deliberately structured to favour the commercial interests of the platform.

Dark patterns are particularly problematic because they exploit well-established cognitive and behavioural tendencies. Consumers operating in digital environments often make decisions rapidly and with limited attention. Interface designers can exploit behavioural biases such as inertia, default bias, scarcity bias, loss aversion, and the tendency to avoid complex decision-making. For example, consumers may retain a subscription because cancelling it requires navigating several complicated menus, even though they no longer wish to use the service. Similarly, a preselected additional service may be accepted simply because the consumer does not notice the option or assumes that it is necessary to complete the transaction. In such circumstances, consumer behaviour cannot be understood solely through the traditional assumption of rational and fully informed choice. The design of the interface itself becomes an instrument capable of shaping the outcome of the transaction.

The problem is further intensified by the significant informational and technological asymmetry between consumers and digital businesses. Platforms can collect and analyse extensive behavioural data concerning consumer preferences, browsing patterns, purchasing histories, and interactions with digital interfaces. This information enables businesses to identify which design strategies are most effective in generating particular consumer responses. Through continuous experimentation and data-driven optimization, interfaces can be adjusted to maximize purchases, subscriptions, data disclosure, or consumer engagement. The resulting relationship therefore extends beyond ordinary commercial persuasion. While legitimate persuasion seeks to communicate the benefits of a product or service, dark patterns may seek to reduce the consumer's ability to resist the transaction by making alternative choices less visible, more difficult, or psychologically uncomfortable.

From a consumer protection perspective, this phenomenon raises important questions concerning the meaning of informed consent and genuine consumer autonomy. Traditional consumer protection mechanisms frequently focus on whether businesses provide accurate information concerning prices, products, contractual terms, and risks. However, dark patterns demonstrate that accurate information alone does not necessarily guarantee meaningful consumer choice. Information may technically be available while being positioned, formatted, or presented in a manner that prevents consumers from adequately understanding or acting upon it. Accordingly, consumer autonomy should not be assessed merely

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by asking whether a consumer clicked a button or accepted contractual terms. A more substantive assessment should examine whether the consumer was provided with a fair and comprehensible opportunity to choose.

3.2. Bridging Interface Design and Consumer Protection Law

The increasing integration of digital technologies into commercial activities has transformed the traditional relationship between consumers and businesses. Online marketplaces, mobile applications, subscription services, social media platforms, and other digital environments have become essential spaces for purchasing goods, accessing services, and entering into contractual relationships. Within these environments, interface design is no longer merely a technical or aesthetic component of digital platforms. It increasingly functions as a mechanism that structures consumer decision-making. The emergence of dark patterns demonstrates that interface architecture can be deliberately designed to influence consumers in ways that may undermine their autonomy and economic interests. This development creates an important intersection between digital design and consumer protection law, requiring legal frameworks to respond not only to misleading information but also to manipulative methods of presenting choices.

Traditional consumer protection law has generally focused on the substance of commercial communications and contractual relationships. Legal rules commonly require businesses to provide accurate information concerning prices, product characteristics, contractual conditions, risks, and consumer rights. Such requirements remain essential, but they may be insufficient when consumer manipulation occurs through the design of an interface rather than through an explicitly false statement. A platform may provide technically accurate information while simultaneously arranging that information in a manner that encourages consumers to select the option most advantageous to the business. For example, a subscription service may clearly disclose its price but make cancellation significantly more complicated than registration. Similarly, an online retailer may disclose an additional charge but reveal it only after the consumer has progressed through several legal stages of the purchasing process. In these circumstances, the central legal concern is not simply whether information exists, but whether the interface allows consumers to understand and exercise their choices meaningfully.

Bridging interface design and consumer protection law therefore requires recognition of the concept of substantive consumer autonomy. A consumer should not be considered adequately protected merely because a formal opportunity to accept or reject a transaction exists. Genuine autonomy requires

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that relevant choices be presented in a transparent, comprehensible, accessible, and reasonably balanced manner. Interface structures that intentionally obscure alternatives, exploit psychological biases, or increase the difficulty of refusing an offer may undermine this autonomy. Accordingly, the legal evaluation of digital transactions should increasingly consider the behavioural effects produced by interface architecture. The question should extend beyond whether a consumer clicked a particular button to whether the surrounding design materially influenced that decision in a manner inconsistent with fairness and informed choice.

The relationship between interface design and consumer protection is particularly significant because digital businesses possess substantial technological and informational advantages. Through data analytics, behavioural tracking, and algorithmic experimentation, businesses can observe how consumers interact with interfaces and identify which design features produce higher rates of purchasing, subscription, disclosure, or engagement. This capability creates a form of structural asymmetry in which businesses can systematically optimize consumer environments while individual consumers generally lack equivalent knowledge concerning the mechanisms influencing their behaviour. Consumer protection law must therefore address not only traditional informational asymmetry but also technological and behavioural asymmetry.

3.3. Reconstruction of Consumer Protection Mechanisms Against Dark Patterns

The proliferation of dark patterns in digital markets necessitates a reconstruction of consumer protection mechanisms that are capable of addressing manipulation embedded within digital interface design. Conventional consumer protection frameworks primarily emphasize disclosure, contractual transparency, misleading advertising, and the provision of accurate information. However, dark patterns demonstrate that consumer harm may occur even when information is technically available and legally disclosed. Manipulation can instead arise from the manner in which choices are structured, displayed, and operationalized. Therefore, consumer protection in the digital environment must evolve from a disclosure-oriented approach toward a broader framework based on design accountability and meaningful consumer autonomy.

The reconstruction of consumer protection mechanisms should begin with stronger preventive obligations for digital businesses. Platforms should be required to evaluate whether their interface designs create unreasonable barriers to consumer choice or exploit predictable cognitive biases. Practices such as hidden costs, preselected additional purchases, confusing cancellation

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procedures, deceptive countdowns, and emotionally coercive prompts should be subject to greater regulatory scrutiny. The principle of fairness should apply not only to contractual terms but also to the digital architecture through which consumers enter into transactions.

Regulatory institutions should also develop technological and behavioural methods of enforcement. Traditional examination of contractual documents may not reveal how a platform manipulates consumers through its interface. Digital interface audits, consumer journey assessments, behavioural testing, and algorithmic monitoring can provide regulators with a more accurate understanding of potentially exploitative practices. Such mechanisms would enable authorities to identify systematic manipulation before it generates widespread consumer harm.

Effective reconstruction must also strengthen consumer remedies. Consumers affected by dark patterns should have accessible mechanisms to cancel transactions, terminate subscriptions, obtain refunds, and challenge unfair digital practices. Where manipulation is systematic, regulatory responses should extend beyond individual compensation and include administrative sanctions and mandatory interface redesign.

Ultimately, the reconstruction of consumer protection mechanisms requires recognition that consumer autonomy depends not only on access to information but also on the conditions under which choices are presented. A design-based regulatory approach can establish a clearer boundary between legitimate commercial persuasion and exploitative manipulation, thereby ensuring that digital innovation remains compatible with fairness, transparency, accountability, and meaningful consumer choice.

4. Conclusion

Dark patterns have emerged as a significant instrument of digital consumer exploitation because they manipulate the environment in which consumers make purchasing and contractual decisions. Rather than relying solely on false or misleading information, these practices operate through interface structures that exploit cognitive biases, obscure material information, complicate cancellation, and encourage consumers to select options that primarily benefit digital businesses. This phenomenon demonstrates that consumer vulnerability in digital markets is increasingly connected to the architecture of technological platforms. The analysis further demonstrates that conventional consumer protection law requires stronger integration with principles of responsible interface design.

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Formal disclosure and contractual consent are insufficient where consumers are presented with choices through interfaces deliberately structured to influence or constrain their decisions. Consumer autonomy should therefore be understood substantively, requiring transparency, accessibility, fairness, and meaningful opportunities to accept or reject digital transactions. Accordingly, consumer protection mechanisms must be reconstructed toward a design-based and preventive regulatory framework. Digital businesses should bear greater responsibility for ensuring that interface designs do not materially distort consumer decision-making, while regulatory authorities should develop technological tools such as interface audits, behavioural assessments, and digital market monitoring. Effective remedies should also enable consumers to cancel transactions, obtain refunds, and challenge systematically manipulative practices. Ultimately, bridging interface design and consumer protection law is essential to ensuring that digital innovation remains consistent with fairness, accountability, transparency, and meaningful consumer autonomy.

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