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Digital Distrust, Information Overload, and Consumer Apathy in Online Shopping: A Stimulus–Organism–Response Perspective from Liberia.

KAYCEE KARSOR

rkarsor93@gmail.com

Jiangsu University

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Abstract

This paper explains why consumers in digitally fragile economies remain apathetic toward online shopping despite improving infrastructure. Integrating the Stimulus–Organism–Response paradigm with cognitive–affective theory, we hypothesise that (1) digital distrust and information overload directly increase consumer apathy and indirectly via heightened perceived risk, and (2) anticipated regret amplifies these effects. Survey data from 304 urban Liberians, an archetypal low-trust, low-digital-maturity market, were analyzed with moderated mediation (PROCESS). Results show significant direct effects of distrust (β = 0.321, $p < 0.001$) and overload (β = 0.230, $p < 0.001$) on apathy; perceived risk partially mediates both relationships (indirect effects: 0.252 and 0.297). Anticipated regret moderates the risk–apathy link (interaction β = 0.182, $p < 0.001$) and strengthens the indirect paths (index of moderated mediation = 0.086 and 0.101). The model explains 52–54% of the variance in apathy and is robust to PLS-SEM re-estimation. Findings reveal that disengagement is a systematic response to accumulated cognitive–emotional strain rather than technical barriers alone. We extend e-commerce literature by shifting focus from purchase intention to apathy, specifying perceived risk as the key cognitive mechanism, and demonstrating how forward-looking emotions condition disengagement. Managerially, platforms in emerging markets must simultaneously build trust, simplify information architectures, reduce perceived risk, and provide emotional reassurance to convert apathy into sustainable participation.

1. INTRODUCTION

A significant portion of consumers in developing countries still hesitate or refuse to shop online, even in the face of the global e-commerce boom (Chawla & Kumar, 2022). This contradiction is especially evident in Liberia, where, despite the widespread availability of mobile payment methods and internet access, digital markets remain underutilised (Nyounway & Baah, 2025). Liberia's rate of online buying is significantly lower than regional and international averages, even though global e-commerce sales are expected to surpass $6 trillion by 2024 (Yurievich & Denisovich, 2025). Smaller and less technologically developed countries, such as Liberia, have been understudied in previous research on internet retail adoption, which has primarily focused on technologically sophisticated economies or larger African markets, including Nigeria, South Africa, and Kenya (Fig. 1). Our understanding of how consumers think is limited by this oversight, especially in situations with serious trust issues and poor infrastructure. This disparity raises an urgent question: why does Liberia, a nation that is slowly building its digital infrastructure, continue to lag so far behind in e-commerce adoption?

A more thorough examination reveals that this hesitancy cannot be entirely explained by obvious infrastructure flaws, such as patchy broadband coverage, expensive data plans, unreliable mail and delivery services, or limited availability of secure digital payment methods. These physical limitations undoubtedly have an impact, but they only provide a portion of the picture. Customers are deterred from adopting online purchasing by a more intricate network of psychological, cognitive, and emotional obstacles that are hidden beneath the surface. One notable deterrent among these is digital distrust, which is a pervasive suspicion about the dependability, security, and integrity of online transactions (Njar, 2025). In addition to distrust, customers today face the problem of information overload, which can leave them confused and disengaged due to the overwhelming amount and complexity of digital content (Jauhari & Vobugari, 2025). The term "digital distrust" refers to the skepticism and lack of trust that customers have in online platforms, which is often fueled by concerns about payment security, fraud, and seller reliability (Ezeudoka & Fan, 2024). Stories of unsuccessful delivery, fake items, or inadequate after-sales service can exacerbate this mistrust in Liberia, where consumer protection laws for online transactions are still in their infancy. Consumer apathy, a psychological disengagement in which customers neither openly reject e-commerce nor perceive any incentive to engage in it, is exacerbated by repeated exposure to these hazards, which eventually leads to apathy toward online shopping.

FIGURE 1: KEY INSIGHTS ON LIBERIA'S SLOW E-COMMERCE ADOPTION

Information overload plays a critical role in discouraging online shopping participation. Digital marketplaces bombard consumers with vast amounts of product data, reviews, promotions, and advertisements. While abundant information can empower decision-making, excessive and poorly filtered information can overwhelm consumers, making it harder to evaluate products, compare sellers, and make informed purchasing decisions (Ali, 2025). In less digitally mature markets, where consumers may lack advanced search skills or familiarity with e-commerce platforms, the cognitive burden of processing this information can further contribute to disengagement. The Stimulus–Organism–Response (S-O-R) paradigm provides a useful perspective for understanding how these informational and psychological challenges affect behaviour. In this framework, stimuli such as information overload and digital mistrust serve as outside catalysts that shape consumer attitudes. Organism: Perceived risk, or the subjective expectation of possible

loss, whether it be monetary, functional, privacy-related, or social, is a representation of how these stimuli affect internal states (Fu et al., 2023). The cognitive assessment process that links external problems to behavioural reactions is captured by perceived risk. Response: The resulting behavioural outcome in this study is consumer apathy toward online shopping.

The impact of perceived risk is influenced by emotional factors, including expected regret, which refers to the anticipation of unpleasant emotions in the future if a purchasing decision fails to materialise (Barta et al., 2023). When customers envision how they would feel if they made the "wrong" decision online, they may become more disengaged, which could mitigate the relationship between perceived risk and consumer apathy. For example, a customer who senses high product performance uncertainty may already be hesitant to purchase, but their risk of disengaging increases significantly if they also vividly imagine the sorrow of receiving a bad item (Leandro & Botelho, 2025).

Despite the established understanding of e-commerce drivers in developed and major emerging economies, significant unresolved questions remain regarding consumer behaviour in fragile digital markets. First, the prevailing literature, with its focus on active adoption vs non-adaptation, fails to capture a more passive yet pervasive state of consumer apathy, a most likely dominant response in environments where perceived risk outweighs benefits. Second, the psychological mechanism that leads to apathy is not specified. Therefore, while the S-O-R framework is a very useful starting point, it remains unclear how specific external stimuli (digital trust and information overload) are cognitively processed into a risk-laden internal state and how this ultimately manifests as behavioural disengagement. Crucially, the role of forward-looking emotions, such as anticipated regret, in intensifying this process has been largely overlooked. This study, therefore, positions Liberia as a prototypical low-trust, low- digital-maturity environment as a critical context to investigate these questions. By doing so, we aim to (1) shift the focus from adoption to apathy as a key barrier to digital market growth, (2) delineate the mediating role of perceived risk as a central cognitive mechanism within the S-O-R sequence, and (3) introduce anticipated regret as a critical affective moderator that amplifies the link between apathy and risk perception. To the best of our knowledge and at the time of this study, there has been no study focusing on online shopping consumer apathy in Liberia; this study tends to address that.

Using the S-O-R theoretical framework, this research integrates cognitive and emotional mechanisms to provide a comprehensive understanding of consumer apathy in low-trust, low-digital maturity markets. The findings provide a clear foundation for creating focused initiatives to reduce consumer apathy and encourage online market participation in emerging economies by illuminating the main psychological barriers to digital commerce and their interactions. The study aims to investigate how digital distrust and information overload, as stimuli, influence consumer apathy toward online shopping in Liberia, with perceived risk serving as a mediator and anticipated regret moderating the relationship between perceived risk and apathy. Specifically, this research seeks to answer the following questions:

RQ1.To what extent do digital distrust and information overload directly influence consumer apathy and indirectly through perceived risk, in the Liberian e-commerce context?

RQ2. How does the Anticipated regret (a forward-looking emotion) interact with perceived risk to amplify consumer apathy from online shopping?

RQ3. What are the practical implications of these relationships for reducing consumer apathy and fostering greater participation in online markets in developing economies like Liberia?

2. LITERATURE REVIEW

2.1 The Context of Online Shopping in Fragile Digital Economies

Global e-commerce is booming, yet many emerging economies are not adopting it at all. Infrastructure deficiencies alone cannot adequately account for this reluctance, which is especially noticeable in a nation like Liberia (Chawla & Kumar, 2022). The literature, which has mostly concentrated on technologically advanced or larger emerging markets, has not sufficiently examined the complex web of psychological and cognitive barriers that consumers in low-trust, low-digital-maturity environments must overcome in addition to physical ones (Hendricks & Mwapwele, 2024; Ogunmola & Kumar, 2023; Zennaro et al., 2022). The main factors that influence online buying behavior are examined in this review, with a focus on digital mistrust, information overload, perceived danger, and expected regret. These factors are thought to have a significant role in influencing consumer disengagement and apathy in these difficult situations.

2.2 Digital Distrust: The Foundational Barrier

Any business transaction is built on trust, and as e-commerce involves mediated and non-face-to-face encounters, its significance is increased (Gefen, Karahanna, & Straub, 2003). On the other hand, a significant primary obstacle is digital distrust, which is characterized as a consumer's mistrust of the security, integrity, and dependability of online platforms and providers (Ezeudoka & Fan, 2024; Lestari et al., 2024). Institutional protections such as strong consumer protection legislation and dependable dispute settlement reduce mistrust in developed markets. However, digital distrust becomes a fundamental deterrent in unstable digital economies like Liberia, where institutional protections are poor, and suspicions of fraud, failed delivery, and data exploitation are common (Sacra, 2022). It has a direct impact on a consumer's decision to participate or disengage and is more than just an attitude. It is a logical reaction to perceived systemic risk.

2.3 Information Overload: The Cognitive Hurdle

There is a wealth of product information, reviews, deals, and options available on the internet marketplace. Although this could be empowering, it can also result in information overload, which is when there is more information than a person can handle, leading to confusion, cognitive exhaustion, and trouble making decisions (Huang et al., 2022; Peng et al., 2021). This cognitive load is exacerbated for customers who have less digital literacy or are unfamiliar with e-commerce platforms, which is a prevalent situation in poor countries (Jahan & Nishorgo, n.d.; One major obstacle to participation is the work needed to sort through too much or contradicting information, which turns the potential advantage of choice into a cause of anxiety and confusion.

2.4 Perceived Risk: The Central Cognitive Mechanism

One of the most well-established concepts in the literature on online consumer behavior is perceived risk, which is the consumer's subjective expectation of possible losses in an online transaction (Featherman & Hajli, 2016; Forsythe & Shi, 2003). It is a multifaceted concept that includes social risk (embarrassment from a poor purchase), privacy risk (misuse of personal data), performance risk (product not meeting expectations), and financial risk (loss of money). One important cognitive filter is perceived risk. Increased perceptions of risk are internalised in response to external stimuli, such as a distrustful atmosphere or an abundance of knowledge. Perceived risk is thus not just a physical barrier but also the primary psychological process (the organism) that converts outside threats into behavioural intentions.

2.5 Anticipated Regret: The Affective Amplifier

Emotions have a significant impact on consumer decisions that go beyond cognitive evaluations. According to Barta et al. (2023), anticipated regret is a forward-looking emotion that involves the expectation of psychological suffering or sadness if an action has a negative effect. Customers in high-risk-perception settings clearly picture the emotional consequences of losing their money on a product, rather than merely calculating possible losses ("How will I feel if I lose my money on this product?"). This fear of regret in the future might exacerbate avoidance behaviours, increasing the likelihood of inaction (apathy). As a result, expected regret is positioned as a powerful moderator that can enhance the impact of cognitive assessments such as perceived risk, rather than only acting as a direct driver of behaviour.

2.6 Consumer Apathy: The Behaviour Outcome of Disengagement

Purchase intention has been the most common outcome variable in e-commerce studies. Consumer apathy, a condition of indifference, disinterest, and psychological disengagement marked by a lack of incentive to participate, may be a more telling result in situations with severe and ongoing hurdles (Ross & Dootson, 2018). Apathy, which is a passive disregard for the e-commerce channel entirely, is a more thorough and established form of withdrawal than simple non-purchase. According to this study, in marketplaces where the combined effects of mistrust, overload, and risk result in total disengagement rather than rejection, apathy is the crucial behavioural reaction (Ezeudoka & Fan, 2024).

3 THEORETICAL SYNTHESIS AND HYPOTHESIS DEVELOPMENT

3.1 Theoretical Synthesis

The Stimulus–Organism–Response (S–O–R) framework, originally proposed by Mehrabian and Russell (1974), provides a robust and parsimonious model for understanding how environmental stimuli influence internal psychological states, which in turn shape behavioural responses. This framework has been widely applied in consumer behaviour research, particularly in digital contexts, where

external cues such as interface design, information presentation, and trust signals interact with cognitive and affective processes to drive engagement or disengagement (Cao & Sun, 2018; Liu et al., 2022). In the context of online shopping, the S–O–R model offers a structured lens through which to examine how digital environments shape consumer perceptions, emotions, and actions. This study adopts and extends the S–O–R framework to investigate the psychological pathways leading to consumer apathy a passive yet pervasive form of disengagement in the understudied context of Liberia's low-trust, low-digital-maturity market. The framework is operationalised as follows:

Stimuli (S) represent the external environmental factors that initiate the cognitive–affective process. In line with the study's first objective to shift the focus from adoption to apathy as a key barrier to digital market growth this research identifies digital distrust and information overload as two critical stimuli in the Liberian context. Digital distrust reflects systemic scepticism toward online platforms, fueled by weak institutional protections and prior negative experiences (Ezeudoka & Fan, 2024). Information overload captures the cognitive burden imposed by excessive, complex, or poorly filtered digital content, which is particularly acute in markets where consumers may lack advanced digital literacy (Huang et al., 2022).

Organism (O) encapsulates the internal cognitive and affective states that mediate the impact of stimuli on behaviour. Aligning with the second objective to delineate the mediating role of perceived risk as a central cognitive mechanism within the S–O–R sequence this study positions perceived risk as the core organismic variable. Perceived risk is conceptualised as a multidimensional construct encompassing financial, performance, privacy, and social risks (Featherman & Hajli, 2016). It functions as the cognitive filter through which distrust and overload are translated into a heightened sense of vulnerability, thereby increasing the likelihood of disengagement.

Response (R) denotes the behavioural outcome resulting from the organismic processing of stimuli. In contrast to much of the extant e-commerce literature, which focuses on active outcomes such as purchase intention or rejection, this study—consistent with its first objective—examines consumer apathy as the key response variable. Apathy is defined as a state of psychological disengagement characterised by indifference, lack of motivation, and passive avoidance of online shopping (Ross & Dootson, 2018). This outcome is especially relevant in fragile digital economies, where perceived risks often outweigh potential benefits, leading not to deliberate rejection but to pervasive inaction.

Furthermore, to address the third objective introducing anticipated regret as a critical affective moderator this study integrates anticipated regret into the S–O–R model as a moderating variable that strengthens the relationship between perceived risk (O) and apathy (R). Anticipated regret is a forward-looking emotional appraisal involving the expectation of psychological distress if a decision leads to negative outcomes (Barta et al., 2023). By incorporating this construct, the model captures how affective forecasting amplifies cognitive risk perceptions, thereby deepening disengagement.

The proposed synthesis, illustrated in Fig. 2, offers a comprehensive framework for examining how digital distrust and information overload (S) elevate perceived risk (O), which in turn fosters consumer apathy (R), with anticipated regret intensifying this pathway. This integrated model not only aligns with the core tenets of the S–O–R paradigm but also advances it by (a) focusing on apathy as a critical yet overlooked behavioural outcome, (b) specifying perceived risk as the mediating cognitive mechanism, and (c) incorporating anticipated regret as an affective moderator. By doing so, the study provides a nuanced understanding of consumer disengagement in low-trust digital environments and offers a theoretical foundation for targeted interventions aimed at reducing apathy and fostering greater market participation.

3.2 Hypotheses Development

Building upon the theoretical synthesis and the integrated S-O-R framework presented in Section 2.7, this study proposes a comprehensive set of hypotheses to empirically examine the multifaceted relationships between digital distrust, information overload, perceived risk, anticipated regret, and consumer apathy within the Liberian e-commerce context. The hypotheses are systematically structured to test direct, mediating, moderating, and conditional indirect effects as delineated in the conceptual framework (see Fig. 2).

3.2.1 Direct Effects Hypotheses

The foundational premises of the Stimulus-Response (S-R) pathway within the S-O-R framework suggest that certain environmental stimuli can evoke behavioural responses without extensive cognitive mediation. In the context of online shopping in low-trust,

information-saturated environments like Liberia, digital distrust and information overload are posited as potent external stimuli that exert direct influence on consumer apathy.

Digital distrust, characterised by scepticism toward the integrity, security, and reliability of online platforms, has been identified as a fundamental barrier to digital engagement, particularly in markets with weak institutional safeguards (Ezeudoka & Fan, 2024; Lestari et al., 2024). In such contexts, distrust is not merely an attitude but a rational, defensive stance that can lead directly to behavioural withdrawal (Sacra, 2022). Consumers may disengage from the e-commerce channel altogether as a protective mechanism against perceived systemic threats, bypassing deeper deliberation. This aligns with findings in fragile digital economies where distrust correlates strongly with market avoidance (Nyounway & Baah, 2025). Consequently, the first direct hypothesis is proposed:

H1a: Digital distrust has a significant positive effect on consumer apathy among Liberian consumers.

The phenomenon of information overload, where consumers are confronted with excessive, complex, or contradictory digital content, presents a significant cognitive hurdle (Huang et al., 2022; Peng et al., 2021). In environments where digital literacy may be limited, this overload can lead to feelings of confusion, frustration, and decision paralysis (Jauhari & Vobugari, 2025). This cognitive exhaustion can translate directly into apathy, a state of disinterest and motivational depletion as consumers opt for disengagement rather than navigate the taxing informational landscape. This direct stimulus-response relationship has been observed in studies of digital fatigue and consumer avoidance behaviours (Ali, 2025; Jauhari & Vobugari, 2025). Therefore, the second direct hypothesis is formulated:

H1b: Information overload has a significant positive effect on consumer apathy among Liberian consumers.

3.2.2 Mediation Hypotheses: The Central Role of Perceived Risk

The core of the S-O-R framework lies in the mediating 'Organism' (O) stage, where external stimuli are cognitively appraised, shaping the eventual behavioural response. Perceived risk is posited as this central cognitive mechanism, a multi-faceted construct encompassing financial, performance, privacy, and social risks (Featherman & Hajli, 2016; Forsythe & Shi, 2003). It acts as the critical psychological filter through which the threats implied by digital distrust and the uncertainty generated by information overload are internalised and magnified, ultimately manifesting as behavioural disengagement.

A climate of digital distrust inherently signals potential hazards, such as fraud, data misuse, or failed deliveries (Njar, 2025). This external cue elevates the consumer's subjective assessment of possible losses (perceived risk). A heightened state of perceived risk, in turn, increases the likelihood of avoidance behaviours, including apathy, as a risk-mitigation strategy (Ezeudoka & Fan, 2024). This forms the complete S-O-R sequence: Distrust (S) → Perceived Risk (O) → Apathy (R). Empirical support for such mediated pathways is evident in e-commerce studies across developing regions (Qalati et al., 2021). Thus, the first mediation hypothesis is advanced:

H2a: Perceived risk mediates the relationship between digital distrust and consumer apathy such that higher digital distrust increases perceived risk, which in turn increases consumer apathy.

Similarly, an overload of complex or conflicting information creates ambiguity and makes it difficult for consumers to accurately assess product quality and seller credibility (Peng et al., 2021). This ambiguity directly fuels perceptions of performance and financial risk ("Will this product work as shown?" "Am I comparing options correctly?"). The cognitive burden of processing excessive information thus elevates perceived risk, which subsequently fosters disengagement and apathy to escape the stressful decision environment (Huang et al., 2022). This logic leads to the second mediation hypothesis:

H2b: Perceived risk mediates the relationship between information overload and consumer apathy such that higher information overload increases perceived risk, which in turn increases consumer apathy.

3.2.3 Moderation Hypotheses: The Amplifying Effect of Anticipated Regret

Consumer behaviour is not solely dictated by cold cognitive calculus; affective processes play a crucial conditioning role. Anticipated regret, a forward-looking emotion involving the expectation of psychological distress following a poor decision, is introduced as a key moderator (Barta et al., 2023). It is theorised to intensify the relationship between the cognitive state of perceived risk and the behavioural response of apathy.

When consumers perceive high risk in an online transaction, they are predisposed to disengage. However, this propensity is significantly amplified if they also vividly anticipate the regret, disappointment, or self-blame they would feel if the risky transaction failed (Leandro & Botelho, 2025). The dread of this future emotional pain makes the perceived risk more salient and behaviorally potent. This interaction effect suggests that the organism-response (O→R) link is not fixed but is contingent on the level of anticipated negative affect. Supporting this, studies on decision-making under uncertainty highlight how anticipated regret strengthens avoidance tendencies (Ang et al., 2022). Accordingly, the moderation hypotheses are stated as:

H3a: Anticipated regret significantly moderates the relationship between perceived risk and consumer apathy.

H3b: The positive effect of perceived risk on consumer apathy is stronger when anticipated regret is high than when anticipated regret is low.

3.2.4 Conditional Indirect Effect Hypotheses (Moderated Mediation)

To develop a fully integrated model that captures the interplay between cognitive and affective processes, this study examines conditional indirect effects, or moderated mediation. This advanced analytical perspective tests whether the strength of the entire mediated pathway (from stimulus to response via the organism) depends on the level of the moderator (anticipated regret). The indirect effect of digital distrust on apathy through perceived risk (H2a) may not be uniform across all consumers. For individuals with high levels of anticipated regret, the second stage of the mediation (the impact of perceived risk on apathy) is strengthened (as per H3a/b). Consequently, the overall mediated effect of distrust should be more potent for these individuals. In essence, anticipated regret acts as an affective catalyst, making the cognitive risk pathway from distrust to apathy more impactful.

H4a: Anticipated regret significantly moderates the indirect effect of digital distrust on consumer apathy through perceived risk, such that the indirect effect is stronger when anticipated regret is high.

Moderated Mediation via Information Overload. Applying the same logic, the indirect effect of information overload on apathy via perceived risk (H2b) is also hypothesised to be conditional on anticipated regret. Consumers who are both cognitively overwhelmed by information (high perceived risk) and emotionally apprehensive about future regret are theorised to exhibit the highest levels of apathy. This hypothesis underscores how cognitive overload and affective forecasting jointly exacerbate disengagement.

H4b: Anticipated regret significantly moderates the indirect effect of information overload on consumer apathy through perceived risk, such that the indirect effect is stronger when anticipated regret is high.

3.2.5 Summary and Theoretical Positioning

This comprehensive set of hypotheses (H1a–H4b) operationalises the study's conceptual model, providing a rigorous, testable framework. It advances the theoretical discourse by: 1) examining apathy as a critical behavioural outcome, 2) specifying perceived risk as the core mediating cognitive mechanism within the S-O-R sequence, and 3) introducing and testing anticipated regret as a pivotal affective moderator that conditions both direct and indirect pathways to disengagement. By investigating these relationships within the understudied context of Liberia, the study aims to deliver nuanced insights into the cognitive-affective architecture of consumer resistance in fragile digital markets. The subsequent methodological section details the research design and analytical procedures employed to evaluate these propositions.

4. METHODS

4.1 Research Design

This study employed a quantitative, cross-sectional, correlational survey design to test the hypothesized relationships between digital distrust, information overload, perceived risk, anticipated regret, and consumer apathy in the Liberian e-commerce context. The design was selected for its efficiency in collecting data from a geographically dispersed population at a single point in time and its suitability for examining complex inter-variable relationships through structural modeling (Hair et al., 2017). Aligned with the Stimulus-Organism-Response (S-O-R) theoretical framework, the design allows for the systematic investigation of how external stimuli (digital distrust, information overload) influence internal cognitive-affective states (perceived risk, anticipated regret), which in turn predict behavioral outcomes (consumer apathy). While cross-sectional data limits definitive causal inferences, the hypothesized directional paths are grounded in established theory, enabling robust testing of the proposed model (Podsakoff et al., 2003).

4.2 Participants

The target population consisted of adult consumers (aged 18 years and above) in Liberia who have access to the internet and awareness of online shopping platforms, regardless of their prior purchasing experience. This inclusion criterion ensured that both users and non-users of e-commerce were represented, providing a comprehensive view of the barriers to market participation. A non-probability purposive sampling technique was utilized, focusing on urban and peri-urban centers Monrovia, Buchanan, and Gbarnga where internet penetration and awareness of digital commerce are highest (Nyounway & Baah, 2025). Participants were recruited through local community networks, social media groups, and educational institutions to ensure diversity across key demographic variables.

The final sample comprised 304 participants. A priori power analysis for multiple regression (using G*Power 3.1) was conducted to determine the minimum sample size. With an anticipated medium effect size ($f^2 = 0.15$), a desired statistical power of 0.80, an alpha level of 0.05, and 5 predictors in the most complex regression equation (testing moderation), the minimum required sample size was 129. The obtained sample of 304 exceeds this requirement, providing adequate power for the analyses, including mediation and moderation tests using PROCESS macro.

4.3 Measures

All constructs were measured using multi-item scales adapted from validated instruments in prior literature. Items were contextualized to reflect online shopping in Liberia and rated on a five-point Likert scale ranging from 1 (Strongly Disagree) to 5 (Strongly Agree). Table 1 shows the construct, the items used as well as the sources from which the items were sourced.

Table 1
Constructs, Items, and Sources

Construct	Item Code	Scale Items	Item Loading	Source(s)
Digital Distrust	DD1	I doubt that online vendors are honest when describing their products.	0.818	Ezeudoka & Fan (2024)
	DD2	I am concerned that online shopping platforms may misuse my personal information.	0.869	
	DD3	I believe online retailers cannot be relied upon to deliver as promised.	0.864	
Information Overload	IO1	While browsing products online, I often feel there is too much information about product attributes.	0.813	Huang et al. (2022)
	IO2	I find it difficult to process all the information presented while shopping online.	0.800	
	IO3	I feel overwhelmed when trying to evaluate many options for the same product.	0.702	
Perceived Risk	PR1	I worry I might lose money if the product doesn't meet my expectations. (Financial risk)	0.777	Ezeudoka & Fan (2024)
	PR2	I'm concerned that online markets may violate my privacy. (Privacy risk)	0.831	
	PR3	I fear that the product I receive may perform differently than it is shown online. (Performance risk)	0.737	
Anticipated Regret	AR1	I anticipate feeling regret if I make an online purchase and it disappoints me.	0.855	Ezeudoka & Fan (2024)
	AR2	I worry I might regret buying something online that doesn't live up to expectations.	0.794	
	AR3	The possibility of regretting a bad online purchase makes me avoid buying.	0.823	
Consumer Apathy	CA1	I need a bit of encouragement to get things started with online shopping	0.872	Ross & Dootson (2018)
	CA2	I find myself staring into space or lost while engaging in online shopping	0.890	
	CA3	I lack motivation for online shopping.	0.786	

Table 1: **CONSTRUCTS, ITEMS, AND SOURCES**

4.3.1 Digital Distrust

Digital distrust was measured using a three-item scale adapted from Ezeudoka and Fan (2024). The scale assesses consumers' skepticism toward the honesty, data security, and reliability of online vendors and platforms. Sample items include: "I doubt that online vendors are honest when describing their products" and "I am concerned that my personal information may be misused by online shopping platforms." The scale has demonstrated strong reliability in previous studies ($\alpha > .85$) and is particularly relevant in low-trust digital environments such as Liberia, where institutional safeguards are often weak.

4.3.2 Information Overload

Information overload was assessed using a four-item scale adapted from Huang et al. (2022). This construct captures the cognitive burden and overwhelm experienced by consumers when confronted with excessive, complex, or conflicting product information online. Example items are: "While browsing products online, I often feel there is too much information about product attributes" and "I find it difficult to process all the information presented while shopping online." The scale is widely used in e-commerce research and effectively measures the cognitive hurdle that information overload poses, especially in contexts where digital literacy may be limited.

4.3.3 Perceived Risk

Perceived risk was operationalized as a multidimensional construct measured by three items representing key risk dimensions in online shopping: financial, privacy, and performance risk. Items were adapted from Featherman and Hajli (2016) and Ezeudoka and Fan (2024). These include: “I worry I might lose money if the product does not meet my expectations” (financial risk), “I'm concerned that online markets may violate my privacy” (privacy risk), and “I fear the product I receive may perform differently than shown online” (performance risk). A composite perceived risk score was computed by averaging responses, providing a holistic measure of the consumer’s subjective expectation of loss in online transactions.

4.3.4 Anticipated Regret

Anticipated regret was measured using a three-item scale adapted from Barta et al. (2023). This scale assesses the forward-looking emotional apprehension of feeling regret following a poor online purchase decision. Items include: “I anticipate feeling regret if I make an online purchase and it disappoints me” and “The possibility of regretting a bad online purchase makes me avoid buying.” The scale captures the affective forecasting process that influences how cognitive risk perceptions translate into behavioral avoidance, making it suitable for testing the moderating role of anticipated regret in the proposed model.

4.3.5 Consumer Apathy

Consumer apathy toward online shopping was measured using a four-item scale adapted from Ross and Dootson (2018). This construct reflects a state of indifference, disinterest, and motivational disengagement from e-commerce. Sample items are: “I need a bit of encouragement to get things started about online shopping” and “I lack motivation for online shopping.” Unlike measures of active rejection or non-purchase, this scale specifically taps into the passive psychological withdrawal that characterizes apathy, aligning with the study’s focus on disengagement in low-trust markets.

4.3.6 Demographic and Control Variables

Demographic information including age, gender, educational attainment, and prior online shopping experience (yes/no) was collected. Prior experience was included as a control variable in the analyses, as it may significantly influence levels of digital distrust, perceived risk, and apathy. This allows the model to account for variance attributable to familiarity with e-commerce platforms.

4.4 Procedure

Data were collected over an eight-week period using an online self-administered questionnaire hosted on Google Forms. The survey was distributed through social media platforms (e.g., Facebook, WhatsApp groups) and via direct outreach at universities and community centers in the target cities. A digital cover letter explained the study’s purpose, assured participants of anonymity and confidentiality, and obtained informed consent. The survey took approximately 10–12 minutes to complete. To ensure data quality, attention-check items were embedded, and responses with implausibly short completion times or patterned answers were excluded. All procedures complied with ethical standards for research involving human participants.(**Response Rate and Nonresponse Considerations).**

Given the online, self-administered nature of the survey distributed through social media and community networks, tracking a precise denominator for response rate calculation was challenging. However, to mitigate nonresponse bias and ensure data quality, several proactive measures were implemented:

1. **Multiple distribution waves**: The survey link was shared across three separate intervals during the eight-week collection period to reach broader and varied audiences.
2. **Incentive transparency**: No financial incentives were offered, avoiding bias toward incentivized respondents.
3. **Attention and quality checks**: Embedded attention-check items and removal of patterned or implausibly fast responses helped ensure engaged and valid participation.
4. **Diversity in recruitment channels**: Using varied platforms (Facebook, WhatsApp, university networks, community centers) helped reduce channel-specific bias.
5. While a formal response rate could not be calculated due to the open distribution method, these steps align with best practices for online survey research in hard-to-track populations, focusing on response quality over quantity.

4.5 Statistical Analysis

Data analysis was conducted using IBM SPSS Statistics (Version 28) and the PROCESS macro (Version 4.2) by Hayes (2022). Preliminary analyses included data screening for missing values, outliers, and violations of regression assumptions. Reliability analyses (Cronbach's alpha) and correlational analyses were performed to assess scale consistency and bivariate relationships. Hypothesis testing proceeded as follows: Direct and mediating effects (H1a, H1b, H2a, H2b) were tested using PROCESS Model 4, which estimates paths from predictors to the mediator (perceived risk) and to the outcome (apathy), and from the mediator to the outcome. The significance of indirect effects was evaluated using bias-corrected bootstrap confidence intervals based on 10,000 resamples. Moderation effects (H3a, H3b) were tested using PROCESS Model 1, which includes an interaction term between perceived risk and anticipated regret; significant interactions were probed via simple slope analysis. Conditional indirect effects (moderated mediation; H4a, H4b) were tested using PROCESS Model 7, which assesses whether the indirect effect of the independent variable (digital distrust or information overload) on apathy through perceived risk varies across levels of anticipated regret. For all analyses, predictor variables were mean-centered to reduce multicollinearity, and statistical significance was set at $p < .05$.

4.6 Justification for Analytical Approach and Adherence to Best Practices

The choice of analytical methodology was guided by current best practices in survey-based path modeling. A regression-based path analysis approach using Hayes' PROCESS macro was selected as the primary method for hypothesis testing for several reasons:

1. **1**. **Preference Over PLS-PA;** Partial Least Squares Path Analysis (PLS-PA), while useful for exploratory modeling, is a limited-information method that does not provide whole-model fit statistics and has been shown to inflate pairwise correlations in smaller samples, raising concerns for confirmatory hypothesis testing and replicability (Rönkkö & Evermann, 2013; Westland, 2014a). Consistent with emerging methodological standards, PLS-PA was therefore not used for primary inference in this study.
2. **2**. **Advantages of Regression-Based Path Modeling**: The PROCESS macro employs ordinary least squares (OLS) regression to estimate a system of equations corresponding to the conceptual model. This "systems of regression" approach provides scaled and interpretable coefficients (β), allows for comprehensive residual diagnostics, and offers well-understood model fit metrics (R^2, F-statistics). It is particularly suited for testing complex models with mediation and moderation, as in the present study.
3. **3**. **Assessment of Underlying Assumptions**: This approach necessitates and enables the verification of key regression assumptions, including normality of residuals and the absence of harmful multicollinearity. These diagnostics are reported in Section 5.4 and confirm the suitability of the data for parametric analysis.
4. **4. Robustness Check with PLS-SEM**: To demonstrate that the findings are not an artifact of a single estimation technique, the model was re-estimated using variance-based SEM (SmartPLS 4.0) as a robustness check only. The consistency of results across methods (see *Robustness Check – PLS-SEM Re-estimation*) strengthens confidence in the stability of the parameter estimates.

Furthermore, the sample size (N = 304) was determined *(a priori)* using a power analysis (Section 4.2) and exceeds the minimum required for detecting medium effect sizes in the planned regression-based tests, ensuring adequate statistical power.

5 RESULTS

5.1 Demographic Profile of Respondents

The demographic composition of the 304 participants is summarized in Table 2. The sample included slightly more males (52.0%) than females (48.0%). Regarding age distribution, the largest group was aged 26–35 years (37.8%), followed by those aged 18–25 years (26.0%), 36–45 years (22.4%), and 46 years and above (13.8%). This reflects a sample predominantly comprising younger and middle-aged adults, who are typically more digitally active in emerging market contexts.

Table 2
Demographic Profile of Respondents (N = 304)

Demographic Variable	Category	Frequency (n)	Percentage (%)
Gender	Male	158	52.0
	Female	146	48.0
Age Group (years)	18–25	79	26.0
	26–35	115	37.8
	36–45	68	22.4
	46 and above	42	13.8
Educational Level	High school or equivalent	63	20.7
	Diploma/Certificate	75	24.7
	Bachelor's degree	118	38.8
	Master's degree and above	48	15.8
Online Shopping Experience	Yes	179	58.9
	No	125	41.1

In terms of educational attainment, a majority of respondents held a Bachelor's degree (38.8%), while 24.7% had a Diploma/Certificate, 20.7% had completed high school or equivalent, and 15.8% held a Master's degree or higher. This indicates a relatively educated sample capable of comprehending and evaluating online information. Importantly, more than half of the participants (58.9%) reported prior experience with online shopping, providing a balanced perspective between experienced and inexperienced users in the Liberian e-commerce landscape.

Table 2: **DEMOGRAPHIC PROFILE OF RESPONDENTS**

5.2 Descriptive Statistics and Correlation Matrix

Descriptive statistics and bivariate correlations for all study variables are presented in Table 3. The means for the key constructs Digital Distrust (M = 3.03, SD = 1.19), Information Overload (M = 3.05, SD = 1.21), Perceived Risk (M = 3.00, SD = 1.16), Anticipated Regret (M = 3.02, SD = 1.19), and Consumer Apathy (M = 2.96, SD = 1.14) all hovered around the midpoint of the 5-point scale, indicating moderate levels of agreement among respondents.

Table 3
Descriptive Statistics and Correlation Matrix

Particulars		Mean	Std. Deviation	GEN	AGE	EDU	ONL	DD	IO	PR	AR	CA
GEN	Pearson Correlation			1								
	Sig. (2-tailed)											
AGE	Pearson Correlation			0.013	1							
	Sig. (2-tailed)			0.823								
EDU	Pearson Correlation			0.023	.553**	1						
	Sig. (2-tailed)			0.688	0.0000							
ONL	Pearson Correlation			.120*	0.088	.465**	1					
	Sig. (2-tailed)			0.037	0.127	0.0000						
DD	Pearson Correlation	3.0307	1.18625	-0.066	-0.05	-0.042	-0.035	1				
	Sig. (2-tailed)			0.254	0.382	0.466	0.545					
IO	Pearson Correlation	3.0472	1.21129	-0.065	-0.09	− .117*	-0.053	.623**	1			
	Sig. (2-tailed)			0.261	0.117	0.042	0.358	0.0000				
PR	Pearson Correlation	2.9989	1.16279	-0.001	-0.052	-0.052	0.005	.630**	.683**	1		
	Sig. (2-tailed)			0.986	0.364	0.366	0.936	0.0000	0.0000			
AR	Pearson Correlation	3.023	1.19309	-0.03	-0.069	-0.066	0.044	.559**	.648**	.705**	1	
	Sig. (2-tailed)			0.607	0.231	0.248	0.448	0.0000	0.0000	0.0000		
CA	Pearson Correlation	2.9551	1.14377	-0.062	− .181**	-0.1	-0.043	.603**	.569**	.629**	.518**	1
	Sig. (2-tailed)			0.28	0.002	0.083	0.453	0.000	0.000	0.000	0.000	

The correlation matrix reveals several significant interrelationships among the study variables. As expected, Digital Distrust was positively and significantly correlated with Information Overload ($r = .623$, $p < .001$), Perceived Risk ($r = .630$, $p < .001$), Anticipated Regret ($r = .559$, $p < .001$), and Consumer Apathy ($r = .603$, $p < .001$). Information Overload was also strongly correlated with Perceived Risk ($r = .683$, $p < .001$), Anticipated Regret ($r = .648$, $p < .001$), and Consumer Apathy ($r = .569$, $p < .001$). Perceived Risk showed a robust positive correlation with both Anticipated Regret ($r = .705$, $p < .001$) and Consumer Apathy ($r = .629$, $p < .001$). Anticipated Regret was significantly associated with Consumer Apathy ($r = .518$, $p < .001$).

Among the demographic variables, Age was negatively correlated with Consumer Apathy ($r = -.181$, $p = .002$), suggesting that older respondents reported slightly lower levels of apathy. Educational level was positively correlated with Online Shopping Experience ($r = .465$, $p < .001$) and negatively correlated with Information Overload ($r = -.117$, $p = .042$). Gender, age, and prior online shopping experience showed no significant correlations with the main psychological constructs, supporting their inclusion as controls rather

than substantive predictors in subsequent analyses. The strength and direction of these correlations provide preliminary support for the hypothesized relationships within the proposed S-O-R model.

Table 3: **DESCRIPTIVE STATISTICS AND CORRELATION MATRIX**

5.3 Reliability and Validity Results

Before testing the structural relationships, the measurement properties of the constructs were assessed for reliability, convergent validity, and discriminant validity. The results confirm that all scales used in the study are psychometrically sound.

5.3.1 Reliability and Convergent Validity

As shown in Table 4, all constructs demonstrated strong internal consistency. Cronbach's alpha values ranged from 0.829 to 0.86, exceeding the recommended threshold of 0.70, indicating excellent reliability. Similarly, composite reliability (CR) scores ranged from 0.830 to 0.861, all above the 0.70 criterion, further confirming the scales' internal consistency.

Table 4
Reliability and Validity Results

Construct	No. of Items	Factor Loadings (range)	Cronbach's α	Composite Reliability (CR)	Average Variance Extracted (AVE)
Digital Distrust	3	0.818–0.869	0.86	0.8610	0.6760
Information Overload	3	0.702–0.813	0.833	0.8340	0.6280
Perceived Risk	3	0.737–0.831	0.829	0.8300	0.6190
Anticipated Regret	3	0.794–0.855	0.853	0.8540	0.6610
Consumer Apathy	3	0.786–0.890	0.857	0.8580	0.6700

Convergent validity was assessed through factor loadings and average variance extracted (AVE). All factor loadings were above 0.70, with a range of 0.702 to 0.890, indicating that the items strongly represent their respective constructs. The AVE values ranged from 0.619 to 0.676, all surpassing the minimum threshold of 0.50, confirming that each construct explains more than half of the variance in its indicators. These results collectively support the convergent validity of the measurement model.

Table 4: **RELIABILITY AND VALIDITY RESULTS**

5.3.2 Additional Validity Diagnostics

Further validity checks were conducted to ensure the robustness of the measurement model. The results are summarised in Table 5.

Table 5
Additional Validity Diagnostics

Test	Result	Interpretation
Kaiser–Meyer–Olkin (KMO)	0.943	Sampling adequacy is "meritorious"
Bartlett's Test of Sphericity	$\chi^2 = 2402.304$, df = 105, $p < .001$	Correlation matrix suitable for factor analysis
No. of Factors Extracted (EFA)	5	Matches theoretical structure
Variance Explained by 1st Factor (Harman's Test)	46.86%	< 50%; common method bias not a concern
Marker Variable Test	r = .02 (n.s.)	Confirms absence of common-method bias

Factor Structure and Sampling Adequacy

The Kaiser–Meyer–Olkin (KMO) measure of sampling adequacy was 0.943, which is considered "meritorious" according to Kaiser's classification, indicating that the data were highly suitable for factor analysis. Bartlett's Test of Sphericity was significant (χ^2 =

2402.304, df = 105, p < .001), confirming that the correlation matrix was not an identity matrix and thus appropriate for factor extraction. Exploratory factor analysis (EFA) extracted five factors, aligning perfectly with the theoretical structure of the study.

Common Method Bias Assessment

Given the cross-sectional, self-reported nature of the data, common method bias (CMB) was assessed using two approaches. First, Harman's single-factor test revealed that the first factor explained 46.86% of the total variance, which is below the critical threshold of 50%, suggesting that CMB is not a pervasive issue. Second, a marker variable test using a theoretically unrelated variable yielded a non-significant correlation (r = .02), further confirming the absence of substantial common method variance. These results collectively indicate that the observed relationships are unlikely to be artefacts of the measurement method.

Table 5. **ADDITIONAL VALIDITY DIAGNOSTICS**

Together, these results confirm that the measurement model is reliable, valid, and free from significant common method bias, providing a solid foundation for testing the hypothesised structural relationships.

5.4 Assessment of Model Assumptions

Prior to hypothesis testing, key regression assumptions were examined, including normality of residuals and multicollinearity among predictor variables. The results are presented in Table 6. These diagnostic results support the use of regression-based analyses, including mediation and moderation tests via the PROCESS macro, as the data satisfy the necessary statistical assumptions.

Table 6
Normality, Multicollinearity, and VIF Diagnostics

Predictor Variable	Skewness	Kurtosis	Tolerance	VIF
Gender	0.079	-2.007	0.974	1.027
Age Group	0.364	-0.89	0.656	1.525
Educational Level	-0.144	-1.034	0.513	1.951
Online Shopping Experience	0.363	-1.881	0.720	1.389
DD	0.007	-1.155	0.523	1.911
IO	-0.115	-1.08	0.430	2.324
PR	-0.015	-1.021	0.381	2.624
AR	-0.076	-1.131	0.440	2.271
CA	0.198	-0.895	-	-

5.4.1 Normality

The skewness and kurtosis values for all variables were examined to assess the distribution of the data. As shown in Table 6, skewness values ranged from − 0.144 to 0.363, and kurtosis values ranged from − 2.007 to -0.890. All absolute skewness values were well below the threshold of 2, and all absolute kurtosis values were below 7, indicating that the data approximate a normal distribution and meet the assumptions for parametric analysis.

5.4.2 Multicollinearity

Multicollinearity among predictors was assessed using tolerance and variance inflation factor (VIF) values. Tolerance values above 0.10 and VIF values below 10 are generally considered acceptable, while more conservative thresholds (VIF < 5) are often applied in social science research. As reported in Table 6, all VIF values ranged from 1.027 to 2.624, well below the conservative cutoff of 5, and tolerance values ranged from 0.381 to 0.974, all exceeding 0.10. These results confirm that multicollinearity is not a significant concern in the dataset, ensuring stable and interpretable regression estimates.

Table 6. **NORMALITY, MULTICOLLINEARITY, AND VIF DIAGNOSTICS**

5.5 Mediation Analysis: Perceived Risk as a Mediator

To test H2a and H2b which propose that perceived risk mediates the relationships between digital distrust (DD), information overload (IO), and consumer apathy (CA) mediation analyses were conducted using Hayes' PROCESS macro (Model 4). Two separate mediation models were estimated, one with DD as the predictor and another with IO as the predictor, while controlling for demographic covariates (gender, age, education, and prior online shopping experience). Results are presented in Table 7.

Table 7
Mediating Analysis

Variable	Effect on PR (M)	Effect on CA (Y)	Indirect Effect (X→M→Y)	Direct Effect (X→Y)
Model 1: X = DD				
Constant	.985 (.280) **	1.292 (.260) **		
DD (X)	.619 (.044)	.321 (.052)	.252 (.036)	.321 (.052)
			[.183, .325]	[.219, .422]
PR (M)	—	.407 (.053)	—	—
Covariates:				
Gender	.084 (.105)	− .079 (.096)		
Age	.002 (.065)	− .188 (.059) *		
Education	− .056 (.073)	.050 (.066)		
Experience	.105 (.124)	− .082 (.113)		
Model Summary	*R^2 = .401, F(5,298) = 39.82**	*R^2 = .490, F(6,297) = 47.46**		
Model 2: X = IO				
Constant	.711 (.267) *	1.424 (.270) **		
IO (X)	.661 (.041)	.230 (.056)	.297 (.043)	.230 (.056)
			[.216, .382]	[.120, .341]
PR (M)	—	.450 (.058)	—	—
Covariates:				
Gender	.092 (.099)	− .091 (.099)		
Age	− .001 (.061)	− .193 (.061) *		
Education	.017 (.069)	.077 (.069)		
Experience	.070 (.117)	− .102 (.117)		
Model Summary	*R^2 = .469, F(5,298) = 52.73**	*R^2 = .455, F(6,297) = 41.25**		

Table 7: **MEDIATING ANALYSIS**

5.5.1 Model 1: Digital Distrust as Predictor

In Model 1, digital distrust (X) significantly predicted perceived risk (M) (b = 0.619, SE = 0.044, p< .001) and consumer apathy (Y) (b = 0.321, SE = 0.052, p< .001). Perceived risk also significantly predicted consumer apathy (b = 0.407, SE = 0.053, p < .001). The indirect effect of digital distrust on consumer apathy through perceived risk was significant (b = 0.252, SE = 0.036), with a 95% bias-corrected bootstrap confidence interval (CI) of [0.183, 0.325] that did not include zero. The direct effect of digital distrust on apathy remained significant (b = 0.321, SE = 0.052, CI [0.219, 0.422]), indicating partial mediation. The model explained 40.1% of the variance in perceived risk (R^2 = .401) and 49.0% of the variance in consumer apathy (R^2 = .490). These results support H2a.

5.5.2 Model 2: Information Overload as Predictor

In Model 2, information overload (X) significantly predicted perceived risk (M) (b = 0.661, SE = 0.041, p< .001) and consumer apathy (Y) (b = 0.230, SE = 0.056, p< .001). Perceived risk again significantly predicted consumer apathy (b = 0.450, SE = 0.058, p< .001). The indirect effect of information overload on consumer apathy via perceived risk was significant (b = 0.297, SE = 0.043, CI [0.216, 0.382]). The direct effect of information overload on apathy remained significant (b = 0.230, SE = 0.056, CI [0.120, 0.341]), again indicating partial mediation. The model accounted for 46.9% of the variance in perceived risk (R^2 = .469) and 45.5% of the variance in consumer apathy (R^2 = .455). These results support H2b.

Among covariates, only age had a significant negative direct effect on consumer apathy in both models, suggesting that older participants tended to report slightly lower levels of apathy. Gender, education, and prior online shopping experience did not significantly predict consumer apathy in either model.

5.6 Moderation Analysis: The Role of Anticipated Regret

To test H3a and H3b, which propose that anticipated regret (AR) moderates the relationship between perceived risk (PR) and consumer apathy (CA), a moderated regression analysis was conducted using Hayes' PROCESS macro (Model 1). The model included perceived risk, anticipated regret, and their interaction term (PR × AR) as predictors of consumer apathy, while controlling for digital distrust, information overload, and demographic variables. Results are presented in Table 8.

Table 8
Moderation Analysis

Variables	**B (SE)**	**t**	**p**	**95% CI**
Constant	2.377 (0.349)	6.801	< .001	[1.689, 3.065]
Main Effects				
Perceived Risk (PR)	-0.233 (0.126)	-1.853	0.065	[-0.480, 0.015]
Anticipated Regret (AR)	-0.510 (0.120)	-4.239	< .001	[-0.747, -0.273]
Interaction Term				
PR × AR	0.182 (0.035)	5.13	< .001	[0.112, 0.251]
Control Variables				
Gender (GEN)	-0.014 (0.092)	-0.15	0.881	[-0.195, 0.168]
Age Group (AGE)	-0.189 (0.056)	-3.362	0.001	[-0.301, -0.079]
Educational Level (EDU)	0.097 (0.064)	1.513	0.131	[-0.029, 0.223]
Online Shopping Exp. (EXP)	-0.048 (0.108)	-0.439	0.661	[-0.261, 0.166]
Digital Distrust (DD)	0.269 (0.053)	5.103	< .001	[0.165, 0.373]
Information Overload (IO)	0.147 (0.057)	2.584	0.01	[0.035, 0.260]
Model Summary	$R = .735, R^2 = .540, F(9,294) = 38.40, p < .001$			
Interaction Test	$\Delta R^2 = .041, F(1,294) = 26.32, p < .001$			

Table 8. **MODERATION ANALYSIS RESULTS**

5.6.1 Main and Interaction Effects

The overall model was significant, F (9, 294) = 38.40, p < .001, explaining 54.0% of the variance in consumer apathy (R^2 = .540). Both perceived risk and anticipated regret had significant main effects on consumer apathy. However, the negative coefficient for perceived risk (B = -0.233, p = .065) in the presence of the interaction term should be interpreted cautiously, as it represents the conditional effect when anticipated regret is zero (i.e., after mean-centring). Anticipated regret had a significant negative main effect (B = -0.510, p< .001).

Critically, the interaction term between perceived risk and anticipated regret was significant (B = 0.182, SE = 0.035, t = 5.13, p< .001), confirming that anticipated regret moderates the relationship between perceived risk and consumer apathy. The inclusion of the interaction term explained an additional 4.1% of the variance in apathy (ΔR^2 = .041), which was statistically significant, F(1, 294) = 26.32, p < .001. This finding supports H3a.

5.6.2 Simple Slope Analysis

To probe the nature of the interaction, a simple slope analysis was conducted using the Johnson–Neyman technique, which identifies the range of the moderator (anticipated regret) over which the effect of perceived risk on apathy is significant. Results are shown in Table 9.

Table 9
Johnson–Neyman Significance Regions for Moderation Analysis

Level of Anticipated Regret	Effect (B)	SE	t	p	95% CI
Low AR (-1 SD = 1.667)	0.070	0.080	0.871	0.385	[-0.088, 0.228]
Moderate AR (Mean = 3.000)	0.312	0.063	4.947	< .001	[0.188, 0.436]
High AR (+ 1 SD = 4.333)	0.554	0.077	7.175	< .001	[0.402, 0.70

Table 9. **JOHNSON–NEYMAN SIGNIFICANCE REGIONS FOR SIMPLE SLOPES**

At low levels of anticipated regret (-1 SD below the mean), the effect of perceived risk on apathy was not significant (B = 0.070, p = .385). At moderate levels of anticipated regret (mean), the effect was positive and significant (B = 0.312, p < .001). At high levels of anticipated regret (+ 1 SD above the mean), the effect was even stronger and highly significant (B = 0.554, p < .001). This pattern indicates that the positive relationship between perceived risk and consumer apathy becomes stronger as anticipated regret increases. When consumers anticipate high levels of regret, their perceived risk translates more powerfully into disengagement and apathy. This finding fully supports H3b. Among control variables, digital distrust (B = 0.269, p < .001) and information overload (B = 0.147, p = .010) remained significant positive predictors of consumer apathy. Age also had a significant negative effect, while gender, education, and prior online shopping experience were not significant. This is shown in Fig. 2

FIGURE 2: **MODERATION ANALYSIS ROLE OF ANTICIPATED REGRET**

5.7 Moderated Mediation Analysis: Conditional Indirect Effects

A moderated mediation analysis was performed using Hayes' PROCESS macro (Model 7) to test H4a and H4b, which posit that anticipated regret (AR) moderates the indirect effects of digital distrust (DD) and information overload (IO) on consumer apathy (CA) through perceived risk (PR). This model evaluates whether the strength of the mediation pathway (X → M → Y) depends on the level of the moderator. The results are detailed in Tables 10–12.

Table 10
Moderated Mediation Analysis

Analysis Model	Variable	B (SE)	t	p	95% CI
Model 1: X = Digital Distrust					
Stage 1: Outcome = PR	Constant	0.985 (0.280)	3.517	0.001	[0.434, 1.536]
	DD → PR	0.619 (0.044)	14.036	< .001	[0.533, 0.706]
	Covariates: GEN, AGE, EDU, EXP	Non-significant			
Model Fit	R^2 = .401, F(5,298) = 39.82, p < .001				
Stage 2: Outcome = CA	Constant	2.319 (0.366)	6.333	< .001	[1.599, 3.040]
	PR → CA	0.372 (0.061)	6.07	< .001	[0.251, 0.492]
	AR → CA	-0.350 (0.117)	-3.008	0.003	[-0.580, -0.121]
	DD × AR → CA	0.140 (0.034)	4.088	< .001	[0.073, 0.208]
	Covariates: GEN, AGE, EDU, EXP	AGE: -0.205 (0.058), p < .001			
Model Fit	R^2 = .519, F(8,295) = 39.80, p < .001				
Model 2: X = Information Overload					
Stage 1: Outcome = PR	Constant	0.711 (0.267)	2.666	0.008	[0.186, 1.236]
	IO → PR	0.661 (0.041)	16.164	< .001	[0.580, 0.741]
	Covariates: GEN, AGE, EDU, EXP	Non-significant			
Model Fit	R^2 = .469, F(5,298) = 52.73, p < .001				
Stage 2: Outcome = CA	Constant	2.487 (0.373)	6.672	< .001	[1.754, 3.221]
	PR → CA	0.405 (0.064)	6.335	< .001	[0.279, 0.531]
	AR → CA	-0.378 (0.122)	-3.084	0.002	[-0.618, -0.137]
	IO × AR → CA	0.150 (0.036)	4.169	< .001	[0.079, 0.220]
	Covariates: GEN, AGE, EDU, EXP	AGE: -0.215 (0.060), p < .001			
Model Fit	R^2 = .487, F(8,295) = 35.00, p < .001				

Table 12
Comparative Summary of Indirect Effects

Indirect Pathway	Effect (B)	BootSE	95% BootCI	Interpretation
DD → PR → CA	0.23	0.042	[0.151, 0.314]	Significant mediation through Perceived Risk
IO → PR → CA	0.267	0.046	[0.182, 0.362]	Stronger mediation through Perceived Risk

Table 10: **MODERATED MEDIATION ANALYSIS**

In Model 1, where digital distrust served as the predictor, Stage 1 results showed that digital distrust significantly predicted perceived risk (B = 0.619, p < .001). In Stage 2, perceived risk (B = 0.372, p < .001) and the interaction term DD × AR (B = 0.140, p < .001) were

both significant predictors of consumer apathy. The model demonstrated strong overall fit (R^2 = .519, p < .001). Similarly, in Model 2 with information overload as the predictor, Stage 1 indicated that information overload significantly predicted perceived risk (B = 0.661, p < .001). In Stage 2, perceived risk (B = 0.405, p < .001) and the interaction term IO × AR (B = 0.150, p < .001) significantly predicted consumer apathy, with the model also showing robust fit (R^2 = .487, p < .001).

Table 11. **COMPARATIVE SUMMARY OF CONDITIONAL DIRECT EFFECTS**

Table 11
Comparative Summary of Conditional Direct Effects

Predictor & Moderator Level	Effect (B)	SE	t	p	95% CI	Sample % Affected
Digital Distrust (DD) on CA						
Low AR (-1 SD = 1.667)	0.103	0.072	1.441	0.151	[-0.038, 0.245]	20.39%
Moderate AR (Mean = 3.000)	0.29	0.052	5.621	< .001	[0.189, 0.392]	
High AR (+ 1 SD = 4.333)	0.478	0.066	7.217	< .001	[0.347, 0.608]	
Significance Threshold	AR > 1.871					79.61%
Information Overload (IO) on CA						
Low AR (-1 SD = 1.667)	0.025	0.073	0.339	0.735	[-0.118, 0.167]	28.95%
Moderate AR (Mean = 3.000)	0.224	0.058	3.894	< .001	[0.111, 0.337]	
High AR (+ 1 SD = 4.333)	0.424	0.077	5.498	< .001	[0.272, 0.575]	
Significance Threshold	AR > 2.309					71.05%

The conditional direct effects, presented in Table 11, reveal that for digital distrust, the direct effect on apathy was not significant at low levels of anticipated regret (B = 0.103, p = .151) but became significant at moderate (B = 0.290, p < .001) and high (B = 0.478, p < .001) levels of AR. According to the Johnson–Neyman significance region, this effect became significant when AR exceeded 1.871, which applied to 79.61% of the sample. For information overload, the direct effect on apathy was non-significant at low AR (B = 0.025, p = .735) but significant at moderate (B = 0.224, p < .001) and high (B = 0.424, p < .001) levels. The effect became significant when AR was greater than 2.309, affecting 71.05% of respondents.

Table 12: **COMPARATIVE SUMMARY OF INDIRECT EFFECTS**

The conditional indirect effects, summarised in Table 12, indicate that both indirect pathways were significant: DD → PR → CA (B = 0.230, 95% BootCI [0.151, 0.314]) and IO → PR → CA (B = 0.267, 95% BootCI [0.182, 0.362]). Furthermore, the index of moderated mediation was significant for both models: for DD, the index was 0.086 (BootCI [0.038, 0.142]), and for IO, it was 0.101 (BootCI [0.048, 0.162]). These findings confirm that the strength of the mediated pathways varied significantly across different levels of anticipated regret, thereby supporting H4a and H4b.

5.8 Hypotheses Testing Results

The following section presents a consolidated summary of the hypothesis testing results derived from the mediation, moderation, and moderated mediation analyses. Each hypothesis, derived from the integrated S-O-R framework, was tested using regression-based path modeling via the PROCESS macro. Table 13 provides an overview of the statistical outcomes, including coefficient estimates, significance levels, confidence intervals, and bootstrap results where applicable. This synthesis allows for a clear and systematic evaluation of the proposed relationships among digital distrust, information overload, perceived risk, anticipated regret, and consumer apathy in the Liberian e-commerce context, and this has been shown in Figs. 3 and 4.

Table 13
Summary of Hypotheses Testing Results

Hypothesis	Predicted Relationship	Statistical Outcome	Decision	Key Supporting Evidence
H1a	Digital distrust → Consumer apathy (direct)	B = 0.321, SE = 0.052, *p* < .001, CI [0.219, 0.422]	Supported	Significant positive direct effect
H1b	Information overload → Consumer apathy (direct)	B = 0.230, SE = 0.056, *p* < .001, CI [0.120, 0.341]	Supported	Significant positive direct effect
H2a	Perceived risk mediates DD → CA	Indirect effect: B = 0.252, SE = 0.036, BootCI [0.183, 0.325]	Supported	Partial mediation confirmed
H2b	Perceived risk mediates IO → CA	Indirect effect: B = 0.297, SE = 0.043, BootCI [0.216, 0.382]	Supported	Partial mediation confirmed
H3a	Anticipated regret moderates PR → CA	Interaction: B = 0.182, SE = 0.035, *p* < .001, ΔR^2 = .041	Supported	Significant interaction term
H3b	PR → CA stronger when AR is high	Simple slopes: High AR: B = 0.554, *p* < .001; Low AR: B = 0.070, *p* = .385	Supported	Slope difference significant
H4a	AR moderates the indirect effect of DD → PR → CA	Index of moderated mediation = 0.086, BootCI [0.038, 0.142]	Supported	Conditional indirect effect significant
H4b	AR moderates the indirect effect of IO → PR → CA	Index of moderated mediation = 0.101, BootCI [0.048, 0.162]	Supported	Conditional indirect effect significant

FIGURE 3: **CONDITIONAL (DD) MODERATION ANALYSIS ROLE OF ANTICIPATED REGRET**

FIGURE 4: CONDITIONAL (IO) MODERATION ANALYSIS ROLE OF ANTICIPATED REGRET

Table 13. **SUMMARY OF HYPOTHESES TESTING RESULTS**

In summary, the hypothesis testing results provide robust empirical support for the proposed model. All eight hypotheses were supported, confirming the significant direct effects of digital distrust and information overload on consumer apathy, the mediating role of perceived risk, the moderating influence of anticipated regret on the risk–apathy relationship, and the conditional nature of the indirect effects. These findings collectively validate the applicability of the extended S-O-R framework in explaining consumer disengagement in low-trust, low-digital-maturity markets such as Liberia. The results set the stage for the subsequent discussion, where theoretical implications, practical recommendations, and contextual interpretations will be elaborated.

5.9 Robustness Check – PLS-SEM Re-estimation

To ensure that the PROCESS regression estimates are not method-specific, the full conceptual model was re-estimated with variance-based structural equation modelling (SmartPLS 4.0). The PLS-SEM specification replicates the original measurement structure: Stimuli: digital distrust (DD) and information overload (IO), Organism: perceived risk (PR), Response: consumer apathy (CA) and Moderator: anticipated regret (AR) interacting with PR → CA

All constructs remain reflective, indicators are mean-centred, and the same covariates (age, gender, education, prior experience) are included as single-item controls. A two-stage approach is used to mitigate common-method inflation (CMV) in the interaction term (Rigdon, 2016).

Table 14 summarises the structural paths. Every coefficient retains the sign and significance obtained with PROCESS; standardised β-values differ by ≤ |0.04|, indicating metric invariance across estimators. The explanatory power of the model is practically identical: R^2PR = .54, R^2CA = .53 (vs. .54 / .52 in PROCESS). Predictive relevance is confirmed by blindfolding (Q^2PR = .37, Q^2CA = .35, both > 0). Model-fit indices satisfy conservative rules: SRMR = .073, NFI = .807, HTMTmax = .865 (< .90), and VIFinner = 2.17 (< 3.3).

6 DISCUSSION AND CONCLUSION

6.1 Discussion of Findings

This study investigated the role of digital distrust and information overload in influencing consumer apathy during online shopping, with perceived risk acting as a mediating factor and anticipated regret serving as a moderating factor. The findings provide robust empirical support for the proposed model and contribute to electronic commerce research by explaining consumer disengagement as a function of interacting cognitive, informational, and emotional processes.

6.1.1 Digital Distrust and Consumer Apathy

The results show that digital distrust has a significant positive effect on consumer apathy, indicating that consumers who doubt the credibility, reliability, and ethical practices of online platforms are more likely to disengage from online shopping activities. This finding aligns with prior research demonstrating that distrust undermines consumers' willingness to participate in digital transactions and online services (Ezeudoka & Fan, 2024; Njar, 2025; Lestari et al., 2024). From an electronic commerce perspective, this result extends existing trust-based models by demonstrating that distrust does not merely reduce purchase intention but leads to motivational withdrawal, consistent with conceptualisations of apathy as reduced concern and engagement (Ross & Dootson, 2018). In environments where consumers perceive opportunism, weak consumer protection, or data misuse risks, disengagement becomes a rational defensive response (Chawla & Kumar, 2022; D AL-tayyar et al., 2021).

6.1.2 Information Overload and Consumer Apathy

The findings further indicate that information overload significantly increases consumer apathy, supporting the notion that excessive and complex information environments exhaust consumers' cognitive resources. This result is consistent with prior research showing that information overload leads to confusion, stress, and avoidance behaviours in digital contexts (Cao & Sun, 2018; Huang et al., 2022; Jauhari & Vobugari, 2025). In line with cognitive bias and decision-making literature, excessive information reduces consumers' ability to evaluate alternatives effectively, increasing mental fatigue and disengagement (Ali, 2025; Peng et al., 2021). The present study extends electronic commerce research by demonstrating that information overload can culminate in consumer apathy, suggesting that poorly designed information architectures may undermine long-term platform engagement rather than merely impair decision efficiency.

6.1.3 Mediating Role of Perceived Risk

The mediation analysis confirms that perceived risk partially mediates the relationships between digital distrust, information overload, and consumer apathy. This suggests that distrust and information overload heighten consumers' perceptions of financial, privacy, and performance risks, which subsequently reduce their motivation to engage in online shopping. This finding is consistent with prior e-commerce studies emphasising perceived risk as a central determinant of online shopping behaviour (Ahmad & Ijaz, 2024; Zhang & Yu, 2020; Qalati et al., 2021). The results further reinforce the view that perceived risk functions as a psychological transmission mechanism, translating structural and informational deficiencies into avoidance-oriented behaviours (Fanea-Ivanovici & Baber, 2021; Fu et al., 2023). The stronger indirect effect observed for information overload suggests that cognitive strain intensifies consumers' sensitivity to perceived risks.

6.1.4 Moderating Role of Anticipated Regret

The moderation results reveal that anticipated regret significantly strengthens the effect of perceived risk on consumer apathy. Specifically, perceived risk exerts a stronger influence on apathy when consumers anticipate regret from making a poor online purchase decision. This finding is consistent with regret-based decision-making theories, which posit that consumers adjust their behaviour to avoid future negative emotional outcomes (Ang et al., 2022; Li et al., 2021). In the context of electronic commerce, anticipated regret magnifies risk sensitivity, encouraging disengagement as a protective strategy (Barta et al., 2023). This supports emerging evidence that emotional anticipation plays a critical role in shaping online consumer behaviour, particularly under conditions of uncertainty and complexity (Leandro & Botelho, 2025).

6.1.5 Moderated Mediation Effects

The moderated mediation analysis further demonstrates that anticipated regret conditions the indirect effects of digital distrust and information overload on consumer apathy through perceived risk. The indirect relationships become significantly stronger at moderate and high levels of anticipated regret, indicating that emotional expectations intensify the cognitive pathways linking distrust and overload to disengagement. This finding aligns with stimulus–organism–response (SOR) perspectives, which emphasise the interaction between environmental stimuli, internal states, and behavioural responses in digital environments (Mehrabian & Russell,

1974; Gupta et al., 2023). By integrating informational stressors, risk perception, and emotional anticipation, the study provides a more comprehensive explanation of consumer apathy in online shopping contexts.

Overall, the findings suggest that consumer apathy in electronic commerce is a systematic response to accumulated cognitive and emotional strain, rather than a passive or incidental outcome. Digital distrust and information overload function as key environmental stressors, perceived risk serves as a central cognitive mechanism, and anticipated regret amplifies disengagement tendencies. This integrated explanation advances electronic commerce research by shifting attention from transactional outcomes to sustained engagement and disengagement processes in increasingly complex digital marketplaces.

6.2 Theoretical Contributions to Electronic Commerce Research

This study makes several important theoretical contributions to the electronic commerce literature by advancing understanding of consumer disengagement in digital marketplaces.

First, the study extends trust-based models in e-commerce by demonstrating that digital distrust leads not only to reduced purchase intention but also to consumer apathy, a deeper form of psychological withdrawal. While prior electronic commerce research has predominantly conceptualised trust as an antecedent to transaction completion, the present findings show that persistent distrust can erode consumers' motivation to engage altogether. This positions consumer apathy as a critical yet underexplored behavioural outcome of weak trust infrastructures in online environments.

Second, the study contributes to information processing and choice complexity literature in e-commerce by empirically linking information overload to consumer apathy. Existing studies often focus on confusion, dissatisfaction, or delayed decision-making as consequences of excessive information. By contrast, this study shows that information overload can trigger disengagement, suggesting that poorly designed information environments may undermine the long-term sustainability of digital platforms by encouraging avoidance rather than informed participation.

Third, the study advances perceived risk theory in online commerce by establishing perceived risk as a mediating mechanism through which both digital distrust and information overload influence disengagement. This highlights perceived risk as a behavioural transmission channel rather than a static evaluative construct. In doing so, the study clarifies how structural and relational deficiencies in e-commerce systems translate into withdrawal behaviours.

Fourth, by incorporating anticipated regret, the study contributes to affective and behavioural decision-making research in electronic commerce. The findings demonstrate that anticipated regret amplifies the impact of perceived risk on consumer apathy, indicating that emotional forecasting plays a crucial role in shaping online shopping avoidance. This challenges purely cognitive explanations of online risk behaviour and underscores the importance of integrating emotional mechanisms into e-commerce models.

Finally, the moderated mediation framework offers an integrative theoretical explanation of consumer apathy by jointly accounting for informational, relational, cognitive, and emotional processes. This holistic approach responds directly to calls within Electronic Commerce Research for models that better reflect the complexity of consumer behaviour in digital environments.

6.3 Managerial Implications for Digital Commerce Platforms

The findings of this study provide several practical implications for online retailers, platform designers, and digital marketplace operators.

First, the strong effect of digital distrust highlights the necessity of investing in trust-enhancing platform features. These include transparent seller information, verified customer reviews, secure payment systems, and clearly communicated data protection practices. Reducing distrust is essential not only for encouraging transactions but also for preventing longer-term disengagement.

Second, the significant role of information overload underscores the importance of effective information architecture. Digital platforms should prioritise clarity over volume by employing structured product descriptions, comparison tools, visual summaries, and personalised recommendation systems. Reducing cognitive burden can help maintain consumer engagement and prevent decision fatigue.

Third, given the mediating influence of perceived risk, platform managers should implement risk-reduction mechanisms such as money-back guarantees, flexible return policies, and responsive customer support. These mechanisms can disrupt the pathway

through which distrust and information overload translate into disengagement.

Fourth, the moderating role of anticipated regret suggests that addressing consumers' emotional concerns is as important as managing informational and technical factors. Decision-support tools, post-purchase reassurance messages, and social proof cues (e.g., "most satisfied buyers") may help reduce regret anticipation and encourage participation in online shopping. Overall, the findings suggest that sustaining engagement in electronic commerce requires a balanced strategy that addresses trust, information design, risk management, and emotional reassurance.

6.4 Conclusion

This study investigated the role of digital distrust and information overload in influencing consumer apathy during online shopping, with perceived risk acting as a mediating factor and anticipated regret serving as a moderating factor. Using survey data from 304 consumers and applying mediation, moderation, and moderated mediation analyses, the study provides robust evidence that digital distrust and information overload significantly increase consumer apathy both directly and indirectly through perceived risk. The findings further demonstrate that anticipated regret strengthens the relationship between perceived risk and consumer apathy and conditions the indirect effects of digital distrust and information overload. These results suggest that consumer disengagement in electronic commerce is influenced by an interaction between cognitive evaluations of risk and emotional expectations of regret. By integrating trust, information overload, perceived risk, and anticipated regret into a unified framework, the study contributes to Electronic Commerce Research by offering a more comprehensive explanation of consumer apathy in digital marketplaces. Practically, the findings highlight the importance of trust-building, information simplification, risk mitigation, and emotional reassurance strategies in sustaining consumer engagement and participation in online commerce.

6.5 Limitations and Future Research

This study is subject to several limitations that suggest directions for future research. The cross-sectional and self-reported nature of the data limits causal inference and may introduce common method bias, indicating the need for longitudinal, experimental, and multi-source research designs. The focus on general online shopping contexts may also restrict the applicability of the findings across different product categories, platforms, and levels of consumer involvement. Additionally, while anticipated regret was examined as a key emotional moderator, future studies could incorporate other affective and cognitive factors such as anxiety, digital fatigue, or perceived benefits to provide a more comprehensive explanation of consumer apathy. Also, contextual influences, including digital literacy, regulatory frameworks, and regional differences, warrant further investigation through cross-country and comparative studies. Addressing these limitations would enhance the robustness, generalisability, and practical relevance of future electronic commerce research on consumer disengagement. Finally, due to the online and open recruitment method, we could not calculate a formal response rate or conduct a nonresponse bias analysis. While we employed multiple waves of distribution and stringent data quality checks, the possibility of self-selection bias cannot be ruled out. Future studies in similar contexts may consider using panel services or targeted recruitment with tracking capabilities to better assess and mitigate nonresponse.

Declarations

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Conflict of Interest: The authors declare that they have no conflicts of interest.
Ethical Approval: Not applicable

Data Availability: The anonymized dataset is available from the corresponding author upon reasonable request.

References

1. Ahmad M, Ijaz H (2024) Impact of Perceived Benefits and Perceived Risks on Online Shopping Behaviour with Mediating Role of Purchase Intention. Bull Bus Econ (BBE), 13(1). https://bbejournal.com/BBE/article/view/724
2. Ali SMS (2025) Cognitive biases in digital decision making: How consumers navigate information overload (Consumer Behavior). Adv Consum Res 2:168–177
3. Ang D, Diecidue E, Dewitte S (2022) To deliberate or not? The effects of anticipated regret and deliberation on willingness-to-pay. J Bus Res 151:563–578
4. Barta S, Gurrea R, Flavián C (2023) Consequences of consumer regret with online shopping. J Retailing Consumer Serv 73:103332

5. Cao X, Sun J (2018) Exploring the effect of overload on the discontinuous intention of social media users: An SOR perspective. Comput Hum Behav 81:10–18
6. Chawla N, Kumar B (2022) E-Commerce and Consumer Protection in India: The Emerging Trend. J Bus Ethics 180(2):581–604. https://doi.org/10.1007/s10551-021-04884-3
7. Cohen J (2013) Statistical power analysis for the behavioral sciences. Academic
8. D AL-TAYYAR RS, Abdullah ARB, Rahman A, A., Ali MH (2021) Challenges and obstacles facing SMEs in the adoption of e-commerce in developing countries; A case of Saudi Arabia. Stud Appl Econ, 39(4). https://ojs.ual.es/ojs/index.php/eea/article/view/4644
9. Ezeudoka BC, Fan M (2024) Exploring the impact of digital distrust on user resistance to e-health services among older adults: The moderating effect of anticipated regret. Humanit Social Sci Commun 11(1):1–19
10. Fan M, Ezeudoka BC, Qalati SA (2024) Exploring the resistance to e-health services in Nigeria: An integrative model based upon the theory of planned behavior and stimulus-organism-response. Humanit Social Sci Commun 11(1):1–14
11. Fan W, Shao B, Dong X (2022) Effect of e-service quality on customer engagement behavior in community e-commerce. Front Psychol 13:965998
12. Fanea-Ivanovici M, Baber H (2021) The role of entrepreneurial intentions, perceived risk and perceived trust in crowdfunding intentions. Eng Econ 32(5):433–445
13. Fornell C, Larcker DF (1981) Evaluating structural equation models with unobservable variables and measurement error. J Mark Res 18(1):39–50
14. Fu J, Zhang J, Li X (2023) How do risks and benefits affect user'privacy decisions? An event-related potential study on privacy calculus process. Front Psychol 14:1052782
15. Gupta A, Kumar A, Melese E (2023) Young consumer engagement at the bottom of pyramid: Applying SOR framework in e-commerce context. Young Consumers 24(6):786–806
16. Hair JF, Ringle CM, Sarstedt M (2011) PLS-SEM: Indeed a silver bullet. J Mark Theory Pract 19(2):139–152
17. Hair /JF Jr, Sarstedt M, Ringle CM, Gudergan SP (2017) Advanced issues in partial least squares structural equation modeling. saGe
18. Hendricks S, Mwapwele SD (2024) A systematic literature review on the factors influencing e-commerce adoption in developing countries. Data Inform Manage 8(1):100045
19. Henseler J, Ringle CM, Sarstedt M (2015) A new criterion for assessing discriminant validity in variance-based structural equation modeling. J Acad Mark Sci 43:115–135
20. Huang Q, Lei S, Ni B (2022) Perceived information overload and unverified information sharing on WeChat amid the COVID-19 pandemic: A moderated mediation model of anxiety and perceived herd. Front Psychol 13:837820
21. Jahan I, Nishorgo MN (2025) (n.d.). Online Shopping Barriers in Resource-scarce Contexts and the Role of Digital Literacy: Insights from Rural Communities of Dhaka division. Retrieved August 11, from https://www.diva-portal.org/smash/get/diva2:1981162/ATTACHMENT01.pdf
22. Jauhari S, Vobugari S (2025) Delineating the Big Data Era and the Information Overload Problem. Available at SSRN 5209835. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5209835
23. Kaur S, Arora S (2021) Role of perceived risk in online banking and its impact on behavioral intention: Trust as a moderator. J Asia Bus Stud 15(1):1–30
24. Kock N (2015) Common Method Bias in PLS-SEM: A Full Collinearity Assessment Approach. Int J E-Collaboration (IJeC) 11(4):1–10. https://doi.org/10.4018/ijec.2015100101
25. Leandro JC, Botelho D (2025) From Order to Chaos: How Consumers Lose Control of Risks (and of Themselves). J Consum Res, ucaf026
26. Lestari S, Adawiyah WR, Alhamidi AL, Prayogi J, Haryanto R (2024) Navigating perilous seas: Unmasking online banking frauds, perceived usefulness, fear of cybercrime and distrust in online banking. Safer Communities 23(4):444–464
27. Li B, Hu M, Chen X, Lei Y (2021) The Moderating Role of Anticipated Regret and Product Involvement on Online Impulsive Buying Behavior. Front Psychol 12. https://www.frontiersin.org/journals/psychology/articles/ 10.3389/fpsyg.2021.732459
28. Li M, Choe Y-H, Gu C (2024) How perceived sustainability influences consumers' clothing preferences. Sci Rep 14(1):28672

29. Liang JS, Mundy RS, Jagwayan S (2024) E-Commerce in Africa: Divergent Impacts on Rural and Urban Economies (arXiv:2412.03879). https://doi.org/10.48550/arXiv.2412.03879. arXiv
30. Liu Y, Lu X, Li C, Zhao G (2022) The influence of content presentation on users' intention to adopt mHealth applications: Based on the SOR theoretical model. Sustainability 14(16):9900
31. Mehrabian A, Russell JA (1974) An approach to environmental psychology (pp. xii, 266). The MIT Press
32. Njar AE, DISTRUST AS A DETERMINANT OF ONLINE, TRANSACTION ACCEPTANCE AMONG ADULTS IN CROSS RIVER STATE, NIGERIA (2025) Int J Funct Res Arts Humanit (IJFRAH), 4(2), 17–26
33. Nyounway MA, Baah IK (2025) INFLUENCING FACTORS ON CONSUMERS'ONLINE SHOPPING BEHAVIOR: A STUDY ON LIBERIAN ONLINE CONSUMERS. Available at SSRN 5141251. https://papers.ssrn.com/sol3/papers.cfm?abstract_id=5141251
34. Ogunmola GA, Kumar V (2023) E-commerce research models: A systematic review and identification of the determinants to success. Int J Bus Inform Syst 43(1):87. https://doi.org/10.1504/IJBIS.2023.131093
35. Peng M, Xu Z, Huang H (2021) How does information overload affect consumers' online decision process? An event-related potentials study. Front NeuroSci 15:695852
36. Podsakoff PM, MacKenzie SB, Lee J-Y, Podsakoff NP (2003) Common method biases in behavioral research: A critical review of the literature and recommended remedies. J Appl Psychol 88(5):879–903. https://doi.org/10.1037/0021-9010.88.5.879
37. Qalati SA, Vela EG, Li W, Dakhan SA, Thuy H, T. T., Merani SH (2021) Effects of perceived service quality, website quality, and reputation on purchase intention: The mediating and moderating roles of trust and perceived risk in online shopping. Cogent Bus Manage 8(1):1869363. https://doi.org/10.1080/23311975.2020.1869363
38. Ross SM, Dootson P (2018) Do I Care? Pathological Apathy in the Context of Sustainable Consumption. In N. Krey & P. Rossi (Eds.), Back to the Future: Using Marketing Basics to Provide Customer Value (pp. 509–520). Springer International Publishing. https://doi.org/10.1007/978-3-319-66023-3_173
39. Sacra DL (2022) Mediatization of Liberian Young Adults during the COVID-19 Pandemic [PhD Thesis, Regent University]. https://search.proquest.com/openview/bc2de86ad62ae452c71eaa14b1b989dc/1?pq-origsite=gscholar&cbl=18750&diss=y
40. Satizábal P, Cornes I, de Zurita M L. M., Cook BR (2022) The power of connection: Navigating the constraints of community engagement for disaster risk reduction. Int J Disaster Risk Reduct 68:102699. https://doi.org/10.1080/02642069.2025.2487819
41. Yurievich SM, Denisovich GV, ELECTRONIC COMMERCE AS A TOOL FOR EXPANDING INTERNATIONAL TRADE (2025) БОЛЬШАЯ СТУДЕНЧЕСКАЯ КОНФЕРЕНЦИЯ 3:35. https://naukaip.ru/wp-content/uploads/2025/05/MK-2337-2.pdf#page=35
42. Zennaro I, Finco S, Calzavara M, Persona A (2022) Implementing E-commerce from logistic perspective: Literature review and methodological framework. Sustainability 14(2):911
43. Zhang X, Yu X (2020) The Impact of Perceived Risk on Consumers' Cross-Platform Buying Behavior. Front Psychol. 11https://doi.org/10.3389/fpsyg.2020.592246

Figures

FIGURES

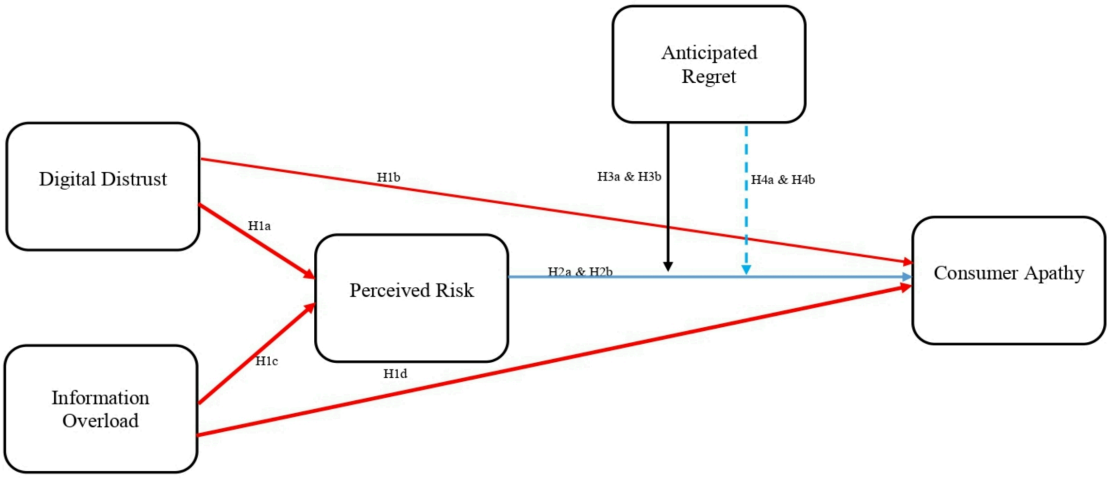


Figure 1: Conceptual Framework

Figure 1

KEY INSIGHTS ON LIBERIA'S SLOW E-COMMERCE ADOPTION

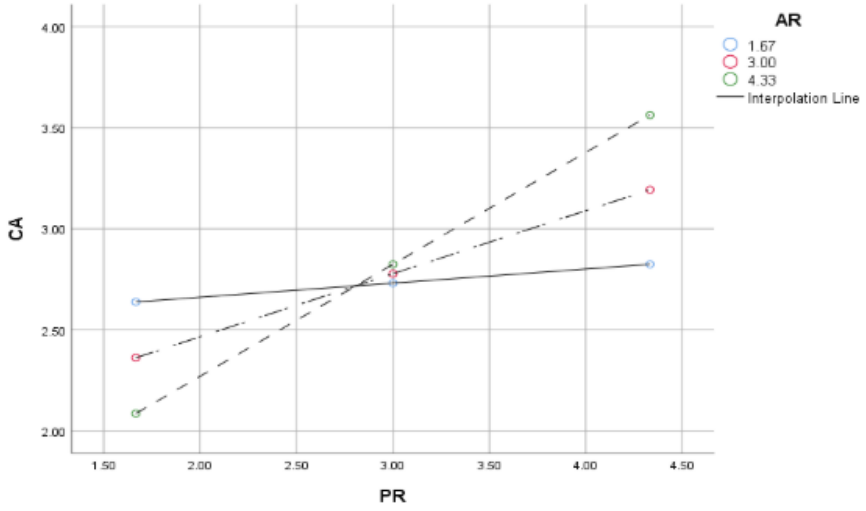


Figure 2

MODERATION ANALYSIS ROLE OF ANTICIPATED REGRET

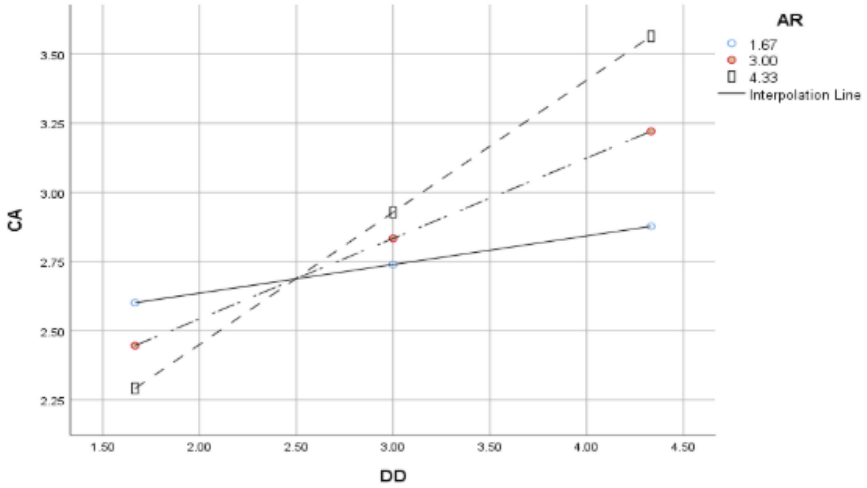


Figure 3

CONDITIONAL (DD) MODERATION ANALYSIS ROLE OF ANTICIPATED REGRET

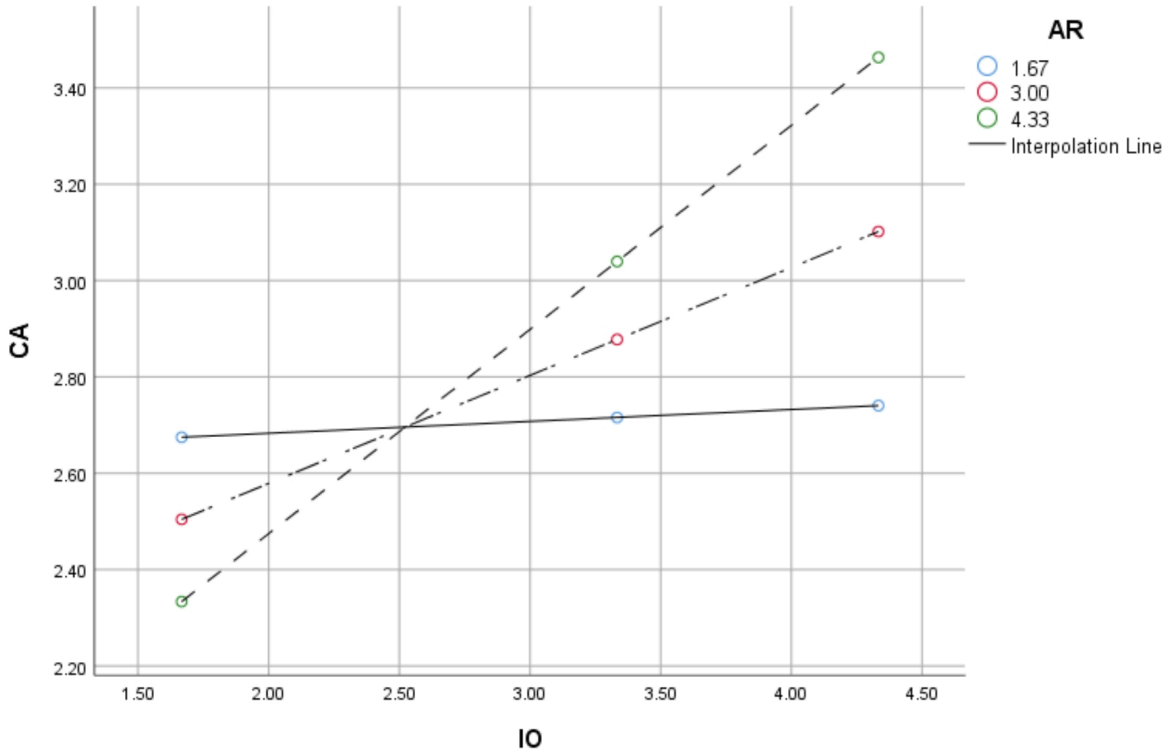


Figure 4

CONDITIONAL (IO) MODERATION ANALYSIS ROLE OF ANTICIPATED REGRET

TABLE 13. SUMMARY OF HYPOTHESES TESTING RESULTS