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Postprint of Research on the Perception Mechanism of Online Review Information Quality for E-commerce Websites

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Abstract

[Purpose/Significance] For e-commerce websites, conducting an in-depth analysis of the online review information quality perception process and elucidating its operational rules and fundamental principles facilitates a comprehensive examination of the information processing and cognitive patterns of users who receive online review information. [Method/Process] First, the connotation and characteristics of online review information quality perception are examined; second, the four elements involved in online review information quality perception are identified; third, the five stages of the online review information quality perception process are elaborated, two contextual influencing factors in the information cognitive processing stage are identified, and a comprehensive analysis of the three types of paths in the online review information quality perception process is conducted; finally, a mechanistic model of online review information quality perception is constructed. [Results/Conclusion] Online review information quality perception constitutes an orderly dynamic cyclic process; constructing a mechanistic model enables holistic comprehension and understanding of the online review information quality perception process, providing theoretical and practical guidance for information quality perception research.

Full Text

Preamble

This study investigates the mechanism of online review information quality perception for e-commerce websites. [Purpose/Significance] By deeply analyzing the process of online review information quality perception and clarifying its operating rules and fundamental principles, this research provides a comprehensive understanding of how information recipients process and cognitively

evaluate online reviews. [Method/Process] The study first examines the connotation and characteristics of online review information quality perception, then identifies four key elements involved in this process. It subsequently elaborates on the five stages of online review information quality perception, identifies two situational factors influencing the information cognitive processing stage, and comprehensively analyzes three types of pathways in this process. Finally, a mechanism model of online review information quality perception is constructed. [Result/Conclusion] Online review information quality perception is an orderly, dynamic, and cyclical process. The constructed mechanism model enables a holistic grasp and understanding of this process, providing theoretical and practical guidance for information quality perception research.

Keywords: online reviews; information quality; perception; mechanism

In the Internet environment, users write online reviews on e-commerce websites after purchasing products or services. These reviews flow directly from writers to readers without "gatekeeping intermediaries,"resulting in highly variable quality. While the current online shopping environment offers abundant information, high-quality reviews remain relatively scarce and are often buried among useless data. Consequently, a new challenge for online review quality research is enabling users to rapidly identify high-quality reviews that meet their needs in terms of both time efficiency and information format/content. In response, some e-commerce companies have developed crowdsourcing-style feedback systems to address these issues [1]. For example, Amazon displays statements like "10 people found this review helpful" beneath its online reviews, where "10" represents the number of helpfulness votes received. However, this feedback mechanism still suffers from "early-bird bias,"where earlier reviews tend to accumulate more votes. Moreover, since consumers focus on different aspects of review information, reaching consensus on the quality of non-expert content like online reviews is difficult—reviews with high vote counts may not meet certain users' standards, making it challenging to identify and quickly obtain high-quality reviews that align with specific users' perceptions and subjective criteria.

Online review information quality perception is an orderly, dynamic, and cyclical process. The primary objective of this paper is to analyze the collaborative mechanisms and principles of interaction among various modules in this system. We argue that the mechanism of online review information quality perception refers to the operating principles and rules through which the five stages—information acquisition, information cognitive processing, information quality evaluation, internal attitude formation, and external behavioral response—interact and coordinate under the support of four elements: subject, object, platform, and environment. Analyzing this mechanism facilitates users' comprehensive understanding of online review information processing and cognition, providing a research framework for in-depth exploration of information quality perception on e-commerce websites.

1 Connotation and Characteristics of Online Review Information Quality Perception

1.1 Connotation

Researchers have analyzed online review quality from two perspectives: objective information quality and perceived information quality. Objective information quality focuses solely on data attributes without considering target users, demanding high-quality information from a technical standpoint [2]. However, online reviews represent user-generated content rather than professional knowledge, making unified quality assessment impossible. During interaction with such information, users are highly susceptible to subjective cognition and usage contexts, hence the term "information quality perception." Perception refers to the process by which individuals receive, select, organize, and assign meaning to stimuli [3]. "Fitness for use" is a common definition of information quality perception, suggesting that only information consumers can judge whether information successfully serves their intended purposes [4]. Through continuous development and refinement, understanding information quality should emphasize not just the information itself but also user perception.

Online review research similarly incorporates this "perception" dimension, examining information quality from the user' s perspective to explore how well information meets user needs and expectations. Through literature review, we define online review information quality perception as a comprehensive judgment and utility evaluation of review quality made by information recipients based on personal needs and contexts, which helps users reduce uncertainty and provides maximum support for purchase decisions.

1.2 Characteristics

1.2.1 Situational Relevance Information quality perception can be studied across various information environments, such as health communities and microblogging platforms. Due to multiple contextual factors—including differences in user characteristics and even task characteristics among the same users—evaluations of information quality perception vary across disciplines. This study focuses specifically on online reviews on e-commerce websites within the online shopping context.

1.2.2 Subjectivity Individuals'perception of information quality is influenced by personal subjective cognition. In the online shopping information environment, this represents subjective judgments based solely on personal values. Even when encountering identical information, different consumers generate different perceptions and evaluations according to their needs and goals.

1.2.3 Multi-dimensionality Evaluating information quality requires multiple dimensions to achieve comprehensive assessment. While most existing studies include dimensions like accuracy, relevance, and completeness, no universal

evaluation framework exists due to situational relevance and data source differences.

1.2.4 Abstractness Both the concept of information quality perception and its constituent evaluation dimensions are abstract. Even when quantified through definitions or computational rules (e.g., for completeness), no unified standards exist for sub-dimensional quantification across different research contexts.

2 Elements of Online Review Information Quality Perception

2.1 Subject Element

All users who read online reviews constitute the subjects of information quality perception—information recipients who receive and process information. Different subjects have varying reading motivations, primarily three types: (1) Casual browsers, who typically lack clear purchase intentions, may develop curiosity or interest due to product or website attraction, and tend to skim reviews briefly without thorough reading or reflection. (2) Potential purchasers, who have strong purchase intentions or clear goals when encountering reviews, usually read extensively to evaluate products. (3) Review writers, who often comment after purchasing products, may check other reviews to compare with their own experiences before writing, especially when holding negative opinions.

2.2 Object Element

While review recipients serve as subjects, the objects upon which subjects act are the online reviews themselves—the targets of perception. Reviews contain direct and indirect content. Direct content appears in various forms, including star ratings, textual descriptions, images, and short videos, covering diverse aspects such as product performance, logistics, and service attitudes. Indirect content reveals information about review authors, seller responses, and user Q&A interactions. Each review thus encompasses varying information volumes with diverse organizational structures and presentation formats. From an information source perspective, content originates from sellers and other users; structurally, it includes both structured and unstructured data; and formally, it comprises visual and auditory elements, creating numerous combinations. When recipients engage in reading behavior, they process at least one review, receiving relevant signals and forming understanding and impressions of products and related aspects.

2.3 Platform Element

E-commerce websites serve as the fundamental platform for both online shopping and information quality perception activities. Their system design, information presentation, and functional settings affect users' information acquisition

and other stages. For e-commerce platforms, stability, practicality, and usability are essential, along with rapid response capabilities and emergency mechanisms. For user experience, platforms should provide online consultation, problem acceptance, credibility guarantees, and easy-to-operate interfaces without hidden unfair terms. For website security, platforms must protect personal information and ensure payment security. Therefore, e-commerce websites constitute the platform element influencing review information quality perception, serving as the carrier where subjects' perception activities and objects' information forms depend on the platform to function.

2.4 Environment Element

A mature and stable online shopping network environment constitutes the environmental element for online review information quality perception, encompassing both technical infrastructure for platform operation and secure transactions, and the foundation for generating and reading reviews. This primarily includes four environments: (1) Network environment, which enables remote information sharing and data transmission, enhancing delivery efficiency. (2) Communication environment, which ensures information transfer across multiple terminals like web and mobile clients. (3) Storage environment, where cloud platforms and related technologies help e-commerce websites store data efficiently while reducing redundancy. (4) Technical environment, where platforms require substantial technical support to create efficient, secure, and reliable systems, such as information desensitization for privacy protection, encryption algorithms for payment security, and big data analytics for precision marketing.

These four elements—subject, object, platform, and environment—must interact and coordinate. E-commerce websites (platform) facilitate daily transactions while effectively hosting online review resources (object), providing an open and free virtual interaction space for information recipients (subject). Subjects complete their evaluation through interaction with information—human-information interaction. Supported by continuously updated network, communication, storage, and technical environments, e-commerce websites adapt to various functional requirements and operate stably, ensuring smooth interaction between subjects and objects. Based on this integration, we construct an element model of online review information quality perception, shown in Figure 1 [Figure 1: see original paper].

3 Process of Online Review Information Quality Perception

Information processing models conceptualize how individuals acquire information from their environment, encode it, and act upon it [5]. Based on this model, the online review information quality perception process involves information recipients' brains receiving external review inputs, processing them cognitively, generating quality evaluations, forming positive or negative internal psychological attitudes based on these evaluations, and finally concluding with external behavioral responses.

3.1 Information Acquisition Stage

In the User-Generated Content (UGC) environment, users contribute content by sharing product opinions on community platforms and access information freely as information seekers, browsing content of interest and easily obtaining information from others'reviews. This stage marks the starting point of online review information quality perception. Compared to traditional media like books, online reviews undergo no layered review or supervision, reaching broader audiences. Stimuli prompting users to enter this stage primarily originate from three sources: (1) Self-need, where users proactively read product-related reviews before purchasing to form product cognition, thus becoming review recipients. (2) Information recommendation, where users receive recommendations from friends, family, or e-commerce platform systems, consciously or unconsciously reading and understanding recommended content to become recipients. (3) Information encountering, a non-linear information behavior where users discover reviews unexpectedly or accidentally without specific needs or low engagement.

3.2 Information Cognitive Processing Stage

Information cognitive processing refers to the entire process by which information recipients acquire stimuli, interpret them through mental processes, and develop corresponding attitudes and activities [6]. In information science, this is often considered an information processing activity. We define online review information cognitive processing as users' cognition, understanding, and processing of review information. Research has evolved from early rational processing models to "bounded rationality" models, recognizing individual differences in information cognitive processing and the importance of user context as a key factor influencing information quality assessment modes. Therefore, information quality assessment should be "boundedly rational."

Cognitive psychology' s Elaboration Likelihood Model (ELM) and Heuristic-Systematic Model (HSM) can explain online review information processing patterns [7]. ELM proposes that information recipients process information through two persuasion routes: central route (high elaboration) and peripheral route (low elaboration). Individual motivation and ability determine which path is chosen. When motivation and ability are high, users employ the central route, engaging in deep thinking about topic details, carefully analyzing information arguments, and expending considerable cognitive effort on specific content. When motivation and ability are low, users employ the peripheral route, using heuristic cues for simple processing without much cognitive effort, such as evaluating information source credibility. In studies of image-based review helpfulness, researchers have treated information richness and reviewer experience as central and peripheral routes, respectively, to explore their effects [8].

Similar to ELM, HSM indicates that heuristic processing involves considering few information cues for judgment, consuming fewer cognitive resources, while systematic processing involves detailed consideration of multiple cues, consum-

ing more resources [9]. These two modes can augment, attenuate, or interact with each other and are not mutually exclusive [10].

Situational factors in the information cognitive processing stage influence user cognition and perception formation. S. Petter et al. [11] identified project characteristics, organizational characteristics, user characteristics, task characteristics, and social characteristics as primary situational factors affecting information quality cognition. Project and organizational characteristics relate to information system development, including variables like IT planning, project management skills, management support, and IS governance [12]. Since online review users cannot access project or organizational characteristics, these factors are not fully applicable. Social characteristics encompass class, nationality, ethnicity, occupation, cultural background, age, and gender [13]. Demographic factors, possessing both biological and social attributes, serve as a key situational factor, emphasizing the transition from subjective to objective cognitive processing. Additionally, user activities online exhibit task differences, requiring analysis from both demographic and task characteristic perspectives.

3.2.1 Demographic Characteristics of Information Recipients Information recipients are not homogeneous, exhibiting individual demographic differences in gender, age, education level, etc. R. Sousa et al. [14] found that users' educational and age characteristics affect their perceptions of website information quality. Moreover, online users exhibit high heterogeneity in information needs and requirement levels. Therefore, demographic characteristics inevitably constitute a key situational factor during cognitive processing.

3.2.2 Task Characteristics of Information Recipients Task characteristics also significantly influence users during cognitive processing. Online shopping tasks fall into two categories: (1) Browsing without specific goals, where users lack focused information search behavior or product purchase relevance. (2) Searching for specific information, where users have explicit needs to obtain appropriate information for optimal online product purchase decisions.

In online product review research, product involvement represents task characteristics—the degree of association between products and user needs under the influence of users' subjective states and products' objective features [15]. Involvement may fluctuate during purchase processes [16]. S. Y. Rieh noted that information recipients with different tasks prioritize different quality requirements [17]. High involvement matches specific information search tasks, where users need more product experience, undergo more information processing to extract knowledge, and exhibit strong goal orientation. Conversely, low involvement matches browsing without specific goals, showing weak goal orientation. Product involvement levels affect users' information acquisition and processing capabilities, thereby influencing perceived risk and purchase decisions [18].

3.3 Information Quality Evaluation Stage

This stage' s primary function is information quality evaluation. Through cognitive processing, information recipients form assessments across multiple dimensions. Information quality evaluation integrates cumulative impacts from various dimensions, each crucial for forming online review quality judgments and reflecting information exchange effectiveness between humans and systems. Previous research has evaluated information quality across different dimensions [19-21]. Building on R. Y. Wang and D. M. Strong' s classification [22], we categorize information quality into intrinsic, contextual, representational, and accessibility dimensions. Since online reviews on e-commerce websites face no accessibility barriers, we exclude accessibility dimensions. Mo Zuying et al. proposed evaluating microblog information quality from four aspects: information volume, content quality, source quality, and utilization [24]. For instance, "adequacy"corresponds to information quantity, while "depth"corresponds to content detail, representing different quality categories.

We evaluate online review quality across ten dimensions: adequacy, depth, reliability, relevance, understandability, conciseness, completeness, accuracy, factuality, and diagnosticity [23]. Notably, diagnosticity can be conceptualized as information usefulness, which researchers have used to reflect review helpfulness [25-26]. Due to individual cognitive processing differences and situational factors, quality evaluations change over time. For example, users processing information through the central route before decision-making are more likely to evaluate multiple quality dimensions. The specific meanings and categories of these dimensions for online review evaluation are shown in Figure 2 [Figure 2: see original paper].

3.4 Internal Attitude Formation Stage

This stage explains how individuals form internal attitudes. In attitude formation theory, attitudes represent belief sets that individuals hold toward specific objects like people or products [27]. For online reviews, this manifests as users' views on review utility and credibility. Researchers have applied the Stimulus-Organism-Response (S-O-R) framework to online contexts, suggesting that users' internal emotional states are influenced by environmental stimuli and subsequently affect external behavioral responses [28]. Information quality evaluation serves as a stimulus acting on the organism. Internal attitudes represent dynamic outcome variables of online information quality—potentially positive factors like trust, loyalty, satisfaction, and pleasure, or negative factors like perceived risk and uncertainty. High-quality information generates positive attitudes and usage intentions [29], while low-quality information produces negative attitudes. This stage can be viewed as the process where information recipients internalize evaluation results into individual emotions after completing information quality assessment.

3.5 External Behavioral Response Stage

External behavioral responses mark the perception process' s conclusion. Information processing models conceptualize how individuals acquire environmental information, encode it into attitudes, and trigger behaviors based on those attitudes [5]. H. Særum et al. similarly identified perceived high-quality information as a factor generating positive online experiences [30]. In real decision-making scenarios, consumption, marketing, persuasion, organizational, information dissemination, and investment behaviors all require information processing and attitude formation [31]. In the online review context, users collect and analyze reviews from specific e-commerce websites, combining acquired information with prior knowledge to form complete evaluation systems. They internalize quality evaluation results into self-attitudes, which then generate external behavioral responses as the final output [32]. For example, purchase decisions represent positive behavioral responses to internal attitudes in shopping contexts, making post-attitude external behavioral responses the perception process' s endpoint.

4 Pathways of Online Review Information Quality Perception Process

The five stages described above are not independent but interconnected through three types of pathways—hierarchical progression, feedback selection, and orderly cycle—forming an integrated, dynamic, and cyclical process.

4.1 Hierarchical Progression

The perception process involves sequential progression through information cognitive processing, quality evaluation, and internal attitude formation stages. After acquiring information, users pass through these stages to form external responses. Specifically, users first read reviews for information acquisition, then process information through neural networks formed by brain neurons to generate cognition [33]. Information source, content, and medium differences affect cognitive processing. Additionally, situational factors—demographic and task characteristics—influence users' selection of central (systematic) and/or peripheral (heuristic) routes in cognitive processing. After forming cognition, the brain conducts holistic quality evaluations across the aforementioned dimensions. The chosen processing mode leads users to emphasize different evaluation dimensions, with high-quality information laying important foundations for positive outcomes [14]. Following quality evaluation, users form internal attitudes (e.g., increased negative risk or heightened positive satisfaction), which subsequently influence external behavioral responses, potentially generating strong purchase intentions or abandonment behaviors.

4.2 Feedback Selection

Users can form internal attitudes through information acquisition, cognitive processing, and quality evaluation stages. However, they may need to return to the

information acquisition stage from either quality evaluation or internal attitude stages, creating feedback loops. This occurs for two reasons: (1) Insufficient existing information prevents internal attitude formation. Limited reviews cannot support well-grounded quality evaluations, making attitude formation difficult. (2) Existing information cannot guide further external behavior. Despite multiple stages, users may still lack adequate information to support final decisions, requiring them to return to the first stage to acquire more relevant information.

4.3 Orderly Cycle

The online review information quality perception process is cyclical, returning from the final behavioral response stage to the initial information acquisition stage. Users enter the perception process with different motivations, but outcomes can be positive or negative: (1) Positive case: If external responses are positive, users will have strong intentions to return to the website. Research shows that satisfying online experiences lead users to revisit sites for information acquisition [34]. (2) Negative case: If internal attitudes are negative, users may reduce or completely lose interest in acquiring product reviews, easily switching to other products for new review information. Notably, external behavioral responses still occur, but negative internal attitudes generate adverse reactions like purchase abandonment, ending the perception process. If users shift to new information channels, they begin a new perception cycle.

5 Construction of Online Review Information Quality Perception Mechanism Model

Based on the comprehensive analysis above, we construct a mechanism model of online review information quality perception, shown in Figure 3 [Figure 3: see original paper]. The subject (information recipient) participates in all stages of the perception process. The subject' s target across information acquisition, cognitive processing, and quality evaluation stages is the object (online review information), while internal attitude formation and external behavioral response stages represent the subject' s internal and external reactions based on object analysis. Different quality evaluations lead to different internal attitudes and external behaviors primarily because demographic and task characteristics influence cognitive processing mode selection during the cognitive processing stage.

All subject perception activities occur on e-commerce website platforms, whose operations rely on mature environmental configurations that ensure effective functioning. Thus, the four elements—subject, object, platform, and environment—coordinate and collaborate to accurately implement all stages of online review information quality perception. This perception is a dynamic, orderly, and cyclical process. The model demonstrates the entire process from information acquisition to external behavioral response, systematically describing the dynamic structure and relationships among stages through pathway analysis, thereby clarifying the process' s fundamental principles and operating rules.

In reality, high-quality online reviews on e-commerce websites are relatively rare and often buried among massive information due to information overload. Information recipients are heterogeneous, making unified quality judgments difficult even for identical reviews. Therefore, extracting high-quality reviews that meet subjective standards represents a key challenge in information quality perception and online review research. This study first clarifies the connotation and four characteristics of online review information quality perception, then analyzes the subject, object, platform, and environment elements and their interactions. It subsequently elaborates the five perception stages, identifies situational influences of demographic and task characteristics on cognitive processing, and examines three inter-stage pathways: hierarchical progression, feedback selection, and orderly cycle. Finally, it constructs a mechanism model of online review information quality perception.

The mechanism model enables holistic understanding of the dynamic, cyclical perception process. This study aims to dissect this process through comprehensive analysis of all elements and stages. Future research will conduct empirical studies based on this mechanism analysis to explore cognitive differences among user types and provide richer practical guidance.

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