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**ARTICLE**

# Revisiting the Effectiveness of Electronic Word-of-Mouth and Dynamic Capability of E-Commerce

***Cheng-Feng Cheng*** [1] , ***Hsi-Ching Chan*** [2*] , ***Shan-Ni Lee*** [3] , ***Jui-Lin Cheng*** [4]

[1] *Department of Business Management, National Taichung University of Science and Technology, Taichung 404, Taiwan*
[2] *Department of Distribution Management, National Taichung University of Science and Technology, Taichung 404, Taiwan*
[3] *Department of Business Administration, National Yunlin University of Science and Technology, Yunlin 640, Taiwan*
[4] *Department of International Business, Asia University, Taichung 41354, Taiwan*

## ABSTRACT

This study contributes to identifying relationships among electronic word-of-mouth (eWOM), dynamic capability, perceived risk, and customer loyalty in cross-border e-commerce. Purposive sampling was employed to obtain empirical data. We chose consumers with experience using cross-border e-commerce platforms as our subjects and collected data through an online questionnaire. Data were collected through consumer surveys, and analyses were conducted using descriptive statistics, factor analysis, reliability analysis, structural equation modeling (SEM), and fuzzy-set qualitative comparative analysis (fsQCA). SEM results support three research hypotheses, showing that enhancing eWOM increases customer loyalty, while improving dynamic capability reduces perceived risk and further strengthens loyalty. fsQCA results identify four distinct combinations of conditions sufficient to achieve high customer loyalty. Path A1 shows that consumers can maintain high customer loyalty if they have a high opinion of eWOM, even if they rate the dynamic capability of cross-border e-commerce low. Path A2 reveals that consumers will demonstrate high customer loyalty as long as they hold a high opinion of the dynamic capability of cross-border e-commerce, even if they have a low evaluation of eWOM, regardless of the perceived risk level. Path A3 indicates that customers will display high loyalty when they highly value eWOM, even in situations of high perceived risk. Path A4 shows that customers will maintain high loyalty when they

*CORRESPONDING AUTHOR:
Hsi-Ching Chan, Department of Distribution Management, National Taichung University of Science and Technology, Taichung 404, Taiwan; Email:jane.sing002@gmail.com

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perceive the dynamic capability of cross-border e-commerce to be strong, even if there is a high level of perceived risk. These findings provide both theoretical insights and practical guidance for e-commerce managers aiming to optimize customer loyalty strategies.

***Keywords:*** Electronic Word-of-Mouth; Dynamic Capability; Perceived Risk; Customer Loyalty; Fuzzy Set

# 1. Introduction

Cross-border e-commerce (CBE) refers to digital transactions conducted over the Internet, encompassing various stages of international business activities such as information collection, customs clearance, payment, services, and business delivery[1]. CBE is defined as the process by which businesses use information and communication technology (ICT) to sell goods and services to customers in foreign markets[2]. Chen and Yang[3] show that as the COVID-19 pandemic continued to affect the global economy in 2020, consumers became more cautious in their purchasing behavior. These online platforms have developed by expanding the influence of critical nodes in the network. In Europe, 71% of online shoppers purchase goods from foreign retailers and marketplaces[2]. In the field of marketing or consumer behavior, loyalty focuses on the relationship established with customers and plays a vital role in understanding consumer behavior[4]. El-Adly[5] indicates that customer loyalty has attracted widespread attention in the field of service marketing because it helps service organizations establish sustainable competitive advantages. Most chain hotel operators recognize the critical importance of customer loyalty to the profitability of hotels. Therefore, they have implemented various reward and loyalty programs to attract and retain hotel customers. In recent years, corporate social responsibility (CSR) has become a key strategy for organizations aimed at maximizing customer loyalty, satisfaction, and profitability, while also enhancing customers' positive perceptions of their brand[6]. Nguyen et al.[7] show that information technology has become one of the primary drivers of economic development. It has profoundly transformed multiple economic sectors and spurred intense market competition. Jeon and Jeong[8] propose that maintaining an effective website is crucial for businesses to attract and retain loyal customers. This study considers customer loyalty as one of the key issues in CBE consumer behavior and explores its important antecedent variables.

Academic literature widely acknowledges the influential role of eWOM (electronic word-of-mouth) in consumer decision-making. eWOM helps discover niche products, thereby driving the emergence of the long tail phenomenon, while also reducing the costs associated with product information search[9]. Yan, Zhou, and Wu[10] indicate that many studies have focused on investigating the influence of eWOM on consumer behavior and the benefits of eWOM for marketers. However, research on the motivations behind disseminating eWOM is relatively scarce. Different channels of eWOM have varying degrees of influence, indicating that considering the type of platform for content dissemination is crucial for marketers and deserves more attention. Several ways in which eWOM differs from TWOM. Firstly, it is not constrained by time and space, meaning anyone with internet access can create and engage in eWOM. For information seekers, this means they can find a wealth of eWOM information online anytime, anywhere. Secondly, the textual form of eWOM written on the internet prevents it from quickly disappearing, facilitating faster dissemination and broader coverage[11].

Vu[12] proposes that for a business to survive in the market, merely controlling tangible or intangible resources is not sufficient. Faced with the demands of new markets, revolutionary technological changes, or new business models, companies must achieve self-renewal and innovation. The ability to effectively allocate and reallocate resources is crucial. Dynamic capability plays a significant role in responding to constantly changing environments. This capability includes perceiving and meeting customer needs, swiftly seizing opportunities to allocate resources and create value, and continually renewing itself through transformation. Some researchers argue that the chief executive officer (CEO) or top management team (TMT) plays a crucial role in fostering dynamic capabilities within organizations. For instance, the personal traits of a CEO may influence the development of organizational knowledge resources, thereby promoting organizational learning and contributing to the

establishment of dynamic capabilities. Different leadership styles within companies may lead to the formation of varying dynamic capabilities[13]. Teece[14] indicates that dynamic capabilities encompass the abilities that an enterprise requires in designing and implementing business models, including sensing, seizing, and transforming. The core of dynamic capabilities lies in coordinating the long-term and short-term performance of enterprises to avoid falling into a "capability trap" (gradually losing competitiveness). The evolution of capabilities is analogous to the evolutionary process of humans in ecology, constantly undergoing cyclical evolution, thereby changing the core capabilities and routines of organizations. Possessing dynamic capabilities is crucial for managing enterprises to achieve and maintain a competitive advantage, particularly in fiercely competitive environments. Therefore, by developing dynamic capabilities, businesses can achieve innovative competition and increase returns[15]. Accordingly, the present study contributes to exploring the effectiveness of eWOM and dynamic capability on customer loyalty.

In the digital environment, consumers face challenges in accurately assessing product quality before making purchases. This poses a significant obstacle for online operators striving to effectively communicate the quality of their products. Furthermore, the absence of geographical boundaries in e-commerce results in increased cultural diversity among consumers, complicating the communication of online product quality cues. As a result, the inherent differences in information amplify consumers' perceived risk due to this cultural heterogeneity[16]. When conducting transactions, collecting consumers' data raises uncertainty about how retailers handle and protect this information. Other major concerns include the inconvenience that providing services may cause and doubts about whether promises to prevent fraud can be accurately fulfilled. These issues directly relate to the responsibility, credibility, and integrity of online retail companies, contributing to perceived risks among consumers[17].

Xie et al.[18] show that engaging in financial transactions through online wealth management platforms may increase individuals' attention to their financial data. For instance, such transactions may incur losses due to technical glitches or unintentional clicks. Viewing this uncertainty as a cost of adopting financial technology aligns with the inherent aspect of perceived value. Therefore, individuals' perceptions of risk associated with financial technology platforms can influence their overall assessment of perceived risk. Because consumers' mobile devices typically store their personal information, conducting monetary transactions through mobile devices often entails higher security and privacy risks. In the risk profile of financial products, perceived risk is considered a significant factor. Individuals' perceptions of perceived risk may negatively impact the acceptance of mobile payments. Therefore, the influence of perceived risk becomes crucial[18]. Therefore, this study further identifies the mediating effect of perceived risk. Accordingly, this study contributes to identifying relationships among eWOM, dynamic capability, perceived risk, and customer loyalty of CBE based on both symmetric and asymmetric thinking in data analysis. Specifically, this study develops the following research objectives:

(1) Explore the impacts of eWOM on perceived risk and customer loyalty of CBE.
(2) Identify the impacts of dynamic capability on perceived risk and customer loyalty of CBE.
(3) Analyze the impact of perceived risk on customer loyalty of CBE.
(4) Revisiting the sufficient conditions of a high level of customer loyalty of CBE.

## 2. Literature Review

When consumers have a higher level of trust in a brand or product, they are more inclined to trust online reviews and recommendations from other consumers, which helps reduce their perceived risk associated with making a purchase. Therefore, eWOM under high brand trust can be seen as a signal indicating that the product or service is trustworthy, thereby lowering consumers' perceived risk[19]. When consumers encounter positive reviews about specific brands, products, companies, or services online, these reviews are often perceived as reliable sources of information, helping to reduce their perceived risk associated with making a purchase. Furthermore, because eWOM represents informal communication among consumers, it carries greater authenticity and credibility, influencing consumers' purchasing decisions and thereby reducing their concerns and perceived risk associated with buying. Therefore, eWOM is considered a factor that helps consumers mitigate perceived risk[20]. Consumers

utilize the internet to seek information about products or companies and share their experiences and opinions, giving rise to eWOM. eWOM involves customers' positive or negative comments about products or companies, which are disseminated through the internet to a wide audience. Research indicates that the consumer-generated information provided by eWOM aids consumers in making purchasing decisions by offering indirect consumer experiences. Particularly crucial in online purchase decisions, eWOM becomes pivotal as it involves greater perceived risk. When consumers perceive positive eWOM that aligns with their viewpoints, they are more likely to consider it a reliable and useful source of information, thus increasing their willingness to purchase. Therefore, eWOM not only provides direct perspectives and experiences on products or services but also helps reduce consumers' perceived risk associated with purchasing [21].

Loyalty is considered the core of people's moral life [22]. According to moral foundations theory, loyalty refers to the continued concern for specific people, things, or events to ensure that they are treated particularly well/fairly [23]. In e-commerce, customer loyalty is increasingly emphasized, with reviews playing a crucial role as a marketing tool to attract new customers and maintain the loyalty of existing ones. eWOM in social media and consumer loyalty is influenced by several factors, including credibility, quality, utility, and acceptance, as well as the demand for and attitudes toward information among customers. Compared to information on websites designed by marketers, eWOM is more credible and relevant, resonating better with customers [24]. Consumers are more inclined to purchase and remain loyal to products that carry widely trusted labels. When customers trust that a product has an eco-friendly label, they are more likely to give it positive reviews, thereby increasing their loyalty to it. However, negative perceptions of a product's environmental credentials (known as greenwashing in the environmental field) can lead to negative word-of-mouth among consumers [25]. Word of mouth helps to enhance customer loyalty because loyal customers are willing to overcome barriers that might prevent them from purchasing a particular brand (such as out-of-stock situations). For these loyal customers, the brand is more readily accepted in their minds. They may have a broader network of associations with the brand, often including vivid autobiographical memories from direct experiences. Therefore, loyal customers are more likely to think about the brand and its attributes than non-loyal customers, and they may do so more frequently. In word-of-mouth communication, people talk about things that come readily to mind, and the increase in accessibility should lead to higher levels of word-of-mouth for more loyal customers [26]. Based on the above theoretical basis, this study establishes H1 and H2 to explore the impacts of electronic word-of-mouth on perceived risk and customer loyalty:

**H1.** *Electronic word-of-mouth can reduce perceived risk.*

**H2.** *Electronic word-of-mouth can improve customer loyalty.*

Tsai and Luan [27] show that dynamic capabilities, including the absorptive capacity of internal resources, are crucial for managing the risks associated with R&D investments. While internal resources play a key role in bearing risks, external resources also provide opportunities to diversify or internalize those risks. Through external connections, businesses can acquire complementary resources such as information, knowledge, skills, technology, channels, and financial resources, thereby enhancing their ability to cope with risks. Consequently, dynamic capabilities can effectively reduce a company's perceived risk. Dynamic capabilities represent an ongoing process in which a company comprehensively and satisfactorily deploys its available resources. Companies with superior marketing capabilities can perceive market changes and respond by creating new resources or reallocating existing ones, thus effectively adapting to market dynamics. In contrast, firms with lower marketing capabilities cannot organize marketing resources efficiently, making it difficult to manage revenue streams and increasing the risk of default. High marketing capability enables a company to enhance its image and reputation, key attributes that creditors consider when assessing the company's default risk. These positive attributes act as insurance-like assets, ensuring debt holders of repayment and thus reducing the company's default risk. Therefore, dynamic capabilities, by improving a company's image and reputation, help to lower perceived risk [28].

Through dynamic capabilities, businesses can promptly perceive market changes and swiftly adjust their strategies, resource allocation, and operations to respond to external environmental shifts and risks. This flexibility and responsiveness enable companies to better control their business en-

vironment, reduce uncertainty, and mitigate risks. Additionally, dynamic capabilities empower enterprises to actively seek opportunities, innovate, and improve, thereby enhancing competitiveness and reducing the likelihood of default risk. Therefore, by enhancing a company's dynamic capabilities, it's possible to effectively lower perceived risk [29]. Flint, Blocker, and Boutin Jr [30] show that loyalty behavior typically manifests as the intention to purchase products and services in the future or to continue collaborating with suppliers. Therefore, customers' evaluations of future business dealings with suppliers are closely related to their willingness to demonstrate loyalty. Dynamic capabilities, such as supplier adaptability and collaboration skills, influence customer loyalty. Hence, dynamic capabilities are related to customer loyalty. Customers typically seek flexible service providers who can meet their unique needs and safety expectations, so specific enhancements in dynamic capabilities during COVID-19 can help boost customer loyalty [31]. Companies with excellent technology management capabilities can innovate, while those lacking internal and external support often affect consumer loyalty and trust, especially during purchase decision-making. Therefore, enterprises with strong dynamic capabilities are more likely to increase customer loyalty, thus gaining a higher reputation when shareholders make investment decisions or product selections [32]. Hariandja and Sartika [33] propose that dynamic marketing capabilities and service innovation capabilities should be integrated with marketing communication to effectively engage with consumers. Excellent marketing capabilities should complement each other to enhance efficiency and amplify the influence of other capabilities across functional departments. Understanding the needs of customers and competitors, and enhancing industry awareness, marketing skills, and capital can improve company performance. Building strong customer relationships through marketing capabilities has a positive impact on customer loyalty. Therefore, dynamic capabilities contribute to enhancing customer loyalty.

Based on these regards, this study develops H3 and H4 to explore the impacts of dynamic capabilities on perceived risk and customer loyalty:

**H3.** *Dynamic capabilities can reduce perceived risk.*

**H4.** *Dynamic capabilities can improve customer loyalty.*

A business-to-business (B2B) supplier's good reputation may incline customers to trust them more compared to competitors with a poor reputation. B2B service providers with a good reputation often attract more customers and maintain the loyalty of existing ones, thereby helping to alleviate customer concerns about perceived risks (i.e., normative beliefs) [24]. The level of risk associated with purchasing a product or service is closely related to the establishment of customer loyalty. All else being equal, consumers typically choose to stick with products or services they are familiar with and satisfied with to minimize unnecessary risks. Therefore, if the risk is perceived to be sufficiently low, it can prompt an initial purchase, and as continued purchases satisfy consumer needs, loyalty begins to form, further reducing risk. With the accumulation of experience from continued consumption, purchasing behavior is reinforced (i.e., positive feedback loop). In other words, as perceived risk decreases, customer loyalty increases [34]. Casidy and Wymer [35] propose that products with strong brand images or store images can effectively reduce customers' perception of risk due to their credibility, thereby enhancing their willingness to make purchases. This effect persists even in cases of service errors. After successfully reducing consumers' perception of risk, their trust and loyalty to the brand also increase. Therefore, there is a relationship between perceived risk and customer loyalty. Yu [36] shows that high perceived risk when using online financial services can impact customer loyalty, making them more inclined to seek alternatives. To mitigate this perception of risk, consumers often prefer to remain loyal to online insurance companies that have provided positive service experiences in the past. Therefore, due to the aversion to high uncertainty, consumers may avoid trying new websites for financial transactions and instead prefer to maintain loyalty to online insurance company websites that have successfully established a lower perceived risk image. Accordingly, this study develops H5 to explore the impact of perceived risk on customer loyalty:

**H5.** *Reducing perceived risk can improve customer loyalty.*

# 3. Materials and Methods

This study investigates the relationships among electronic word-of-mouth (eWOM), dynamic capability, perceived risk, and customer loyalty in the context of cross-border e-commerce. Accordingly, the research participants

were consumers with prior experience using cross-border e-commerce platforms. A purposive sampling approach was employed, as it enables researchers to deliberately select participants who meet specific criteria aligned with the study's objectives. Data were collected through an online questionnaire designed using Google Forms. The questionnaire link was disseminated primarily via social networking platforms, including Line and Facebook, targeting individuals who had prior experience with cross-border e-commerce. The survey was conducted between May and June 2024 over a two-month period. To ensure data quality, responses were carefully screened, and incomplete or invalid questionnaires were excluded. This process yielded a final sample of 263 valid responses, which served as the basis for subsequent analyses. In line with ethical research standards, all participants were informed about the study's purpose and assured of anonymity and confidentiality prior to participation. Informed consent was obtained electronically before respondents proceeded with the questionnaire.

Based on See-To and Ho[37], eWOM refers to informal communication transmitted to consumers through internet technologies, encompassing opinions, comments, and views regarding the usage, features, attributes, or related matters of specific products or services. Accordingly, three items were developed to measure eWOM: eWOM01 (Product reviews are information relevant to me), eWOM02 (Product reviews are helpful to me), and eWOM03 (Product reviews are the information I need). According to Vu[12], dynamic capability refers to the ability of businesses to integrate, build, and reconfigure their internal and external resources and capabilities in rapidly changing international market environments. Based on Liu et al.[13], six items were developed to measure dynamic capability: DC01 (I believe the e-commerce platform will be committed to improving quality), DC02 (I believe that the e-commerce platform will continue to improve the reliability of its products and services), DC03 (I believe that the e-commerce platform will enhance operational efficiency), DC04 (I believe that the e-commerce platform will continuously conduct surveys to understand the satisfaction levels of existing customers), DC05 (I believe that the e-commerce platform will adjust the products/services it offers), and DC06 (I believe that the e-commerce platform will enhance its knowledge and skills in existing products and technologies). Per Seo and Lee[38] and Xie et al.[18], cross-border e-commerce perceived risk in this study covers the various risks that consumers face in conducting cross-border transactions. Based on Rosillo-Díaz et al.[16], five items were developed to measure perceived risk: PR01 (I believe that the platform may not operate smoothly), PR02 (I believe that the built-in security system of the platform is not robust enough), PR03 (I believe that there is a possibility of encountering issues during the operation of the platform), PR04 (I believe that registering on this platform carries risks), and PR05 (I believe that shopping on this platform is not a wise way to spend money). Customer loyalty is defined as the tendency of customers to consistently choose the same brand or service, showing trust and preference, and exhibiting confidence in the value they perceive from it[7, 39]. Based on Dam and Dam[40], four items were developed to measure customer loyalty: CL01 (I would shop again on this platform), CL02 (I would recommend this platform to my friends), CL03 (If I need to shop again, I would come back to this platform), and CL04 (I would actively talk to others about this platform).

# 4. Results

The demographic profile of the 263 respondents shows that the majority were female (69.0%), 71.4% were single, 66.1% were students or service employees, 66.1% were under 30 years old, most had attended college or university (71.0%), and the average annual income was below USD 20,000. Factor analysis results, based on Hair Jr. et al.[41], show that the Kaiser-Meyer-Olkin (KMO) values range from 0.741 to 0.902 (>0.5), with all $p$-values at 0.000 (<0.05), indicating suitability for factor analysis. Convergent validity coefficients for eWOM, dynamic capability, perceived risk, and customer loyalty are 0.850, 0.725, 0.689, and 0.720, respectively, all exceeding the 0.6 threshold. Cronbach's α coefficients for these constructs are 0.911, 0.923, 0.885, and 0.857, respectively, demonstrating strong internal consistency (see **Table 1**).

Based on the criteria provided by Hair Jr. et al.[41], the CMIN/DF should be less than 3, the GFI should be greater than 0.9, the AGFI should be greater than 0.9, the NFI should be greater than 0.95, the CFI should be greater than 0.95, and the RMSEA should be less than 0.08. In this

study, the CMIN/DF is 1.944 (<3), the GFI is 0.922 (>0.9), the AGFI is 0.877 (close to 0.9), the NFI is 0.940 (close to 0.95), the CFI is 0.970 (>0.95), and the RMSEA is 0.060 (<0.08). These results indicate that the research framework composed of four constructs, including electronic word-of-mouth, dynamic capability, perceived risk, and customer loyalty, exhibits a good model fit. Results of path analysis indicate that eWOM does not have a significant effect on perceived risk, with a standardized regression weight of 0.023, a C.R. value of 0.347, and a *p*-value of 0.729 (>0.1). Therefore, empirical evidence does not support H1. The second hypothesis explores the impact of eWOM on customer loyalty. The findings show a significant positive effect of eWOM on customer loyalty, with a standardized regression weight of 0.492, a C.R. value of 8.210, and a *p*-value of 0.000 (<0.1). Thus, empirical evidence supports H2. The third hypothesis examines the effect of dynamic capability on perceived risk. Empirical results show a significant negative impact, with a standardized regression weight of −0.114, a C.R. value of −1.686, and a *p*-value of 0.092 (<0.1). Therefore, H3 is supported by the empirical evidence. The fourth hypothesis assesses the impact of dynamic capability on customer loyalty. The findings indicate a significant positive effect, with a standardized regression weight of 0.451, a C.R. value of 7.342, and a *p*-value of 0.000 (<0.01). Consequently, H4 is supported by empirical evidence. The fifth hypothesis investigates the effect of perceived risk on customer loyalty. The empirical results show no significant impact, with a standardized regression weight of −0.023, a C.R. value of −0.429, and a *p*-value of 0.668 (>0.1). Thus, H5 is not supported by empirical evidence (see **Table 2**).

**Table 1.** Results of factor and reliability analysis.

| Constructs | Number of Items | KMO | *p*-Value | Convergent Validity | Cronbach's α |
|---|---|---|---|---|---|
| Electronic word-of-mouth | 3 | 0.741 | 0.000 | 0.850 | 0.911 |
| Dynamic capability | 6 | 0.902 | 0.000 | 0.725 | 0.923 |
| Perceived risk | 5 | 0.861 | 0.000 | 0.689 | 0.885 |
| Customer loyalty | 4 | 0.743 | 0.000 | 0.720 | 0.857 |

**Table 2.** Results of SEM.

| Constructs | Standardized Regression Weights | C.R. | *p*-Value |
|---|---|---|---|
| H1: eWOM→PR | 0.023 | 0.347 | 0.729 |
| H2: eWOM→CL | 0.492*** | 8.210 | 0.000 |
| H3: DC→PR | −0.114* | −1.686 | 0.092 |
| H4: DC→CL | 0.451*** | 7.342 | 0.000 |
| H5: PR→CL | −0.023 | −0.429 | 0.668 |

Notes: * indicates *p*-value < 0.1; ** indicates *p*-value < 0.05; *** indicates *p*-value < 0.01. eWOM means electronic word-of-mouth, DC means dynamic capability, PR means perceived risk, and CL means Customer loyalty.

This study further employs fuzzy set qualitative comparative analysis (fsQCA) to investigate the sufficient conditions leading to high customer loyalty by analyzing the variables eWOM, dynamic capability (DC), and perceived risk (PR). **Table 3** identifies four sufficient conditions (i.e., Path A1, A2, A3, and A4) that are sufficient to achieve high customer loyalty. The solution coverage is 0.58 (>0.1), and the solution consistency is 0.93 (>0.6). According to the criteria provided by Ragin[42], these four sufficient conditions demonstrate strong explanatory power and consistency. Path A1 indicates that when consumers have a high regard for eWOM, they can maintain high customer loyalty even if they have a low evaluation of the dynamic capability of cross-border e-commerce. Path A2 reveals that consumers will exhibit high customer loyalty as long as they have high regard for the dynamic capability of cross-border e-commerce, even if their evaluation of eWOM is low, irrespective of the level of perceived risk. Path A3 demonstrates that customers will show high loyalty when they highly regard eWOM, even in the presence of high perceived risk. Path A4 indicates that customers will maintain high loyalty when they perceive cross-border e-commerce to have a high dynamic capability, even when there is also a high level of perceived risk.

**Table 3.** Intermediate solution of fsQCA.

| Path | eWOM | DC | PR | Raw Coverage | Unique Coverage | Consistency |
|---|---|---|---|---|---|---|
| A1 | ● | ○ | | 0.30 | 0.02 | 0.96 |
| A2 | ○ | ● | | 0.26 | 0.01 | 0.97 |
| A3 | ● | | ● | 0.53 | 0.00 | 0.95 |
| A4 | | ● | ● | 0.52 | 0.00 | 0.95 |
| Solution coverage: 0.58 | | | | | | |
| Solution consistency: 0.93 | | | | | | |

Notes: The blank cells represent "don't care" conditions. White circles "○" indicate the absence or negation of causal conditions. Black circles "●" indicate the presence of causal conditions (i.e., antecedents). eWOM means electronic word-of-mouth, DC means dynamic capability, PR means perceived risk, and CL means Customer loyalty.

# 5. Discussion

This study contributes to exploring the connections between eWOM, dynamic capability, perceived risk, and customer loyalty in cross-border e-commerce using both symmetric and asymmetric data analysis methods. We have outlined four main research objectives to verify the relationships among these constructs. To ensure that the four research objectives can be achieved, this study uses symmetric (i.e., SEM) and asymmetric (i.e., fsQCA) data analysis methods, respectively. SEM primarily focuses on achieving the first three objectives, which are: (1) Explore the impacts of eWOM on perceived risk and customer loyalty in cross-border e-commerce. (2) Identify the impacts of dynamic capability on perceived risk and customer loyalty in cross-border e-commerce. (3) Analyze the impact of perceived risk on customer loyalty in cross-border e-commerce. This study further employs fsQCA to achieve the fourth research objective. The following explanations, based on SEM and fsQCA results, address the research objectives: For Research Objective 1, the primary focus is to explore the effects of eWOM on perceived risk and customer loyalty. The path analysis results from SEM indicate that hypothesis H1 is not supported, while hypothesis H2 is supported. In other words, enhancing eWOM does not significantly affect perceived risk but can concretely increase customer loyalty. For Research Objective 2, the aim is to confirm the effects of dynamic capability on perceived risk and customer loyalty. The SEM path analysis results show that strengthening the dynamic capability of cross-border e-commerce indeed helps to reduce perceived risk and increase customer loyalty. For Research Objective 3, this objective explores the impact of perceived risk on customer loyalty. The empirical results also show that reducing perceived risk indeed helps to enhance customer loyalty in cross-border e-commerce.

This study seeks to explore the connections between eWOM, dynamic capability, perceived risk, and customer loyalty in cross-border e-commerce using both symmetric and asymmetric data analysis methods. We have outlined four main research objectives to verify the relationships among these constructs. To ensure that the four research objectives can be achieved, this study uses symmetric (i.e., SEM) and asymmetric (i.e., fsQCA) data analysis methods, respectively.

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# 6. Conclusions

According to the results of SEM, improving eWOM can improve customer loyalty. Results of descriptive statistical analysis identify that eWOM01 (Product reviews are information relevant to me) has the lowest mean score (5.43), indicating that consumers feel the relevance of reviews is insufficient. According to the content of the questionnaire, this study recommends that business can precisely target their audience by analyzing data on the products consumers purchase to determine the specific needs and interests of different consumer groups. Additionally, they can set up templates or prompts in the review section to help consumers write more specific and relevant reviews. For example, prompts like "Please share how you used this product" or "What problem did this product solve for you?" can be effective. eWOM03 (Product reviews are the information I need) has the lowest standard deviation (1.230), indicating that review information is necessary for most consumers. Businesses can emphasize key reviews by pinning the most useful and detailed reviews at the top or marking them as "most helpful reviews." This enables consumers to quickly find the information they need. Furthermore, encouraging consumers from diverse backgrounds and with different needs to write reviews ensures a diverse range of content that can meet various consumer needs. The results of the factor analysis show that eWOM02 (Product reviews are helpful to me) has the highest factor loading (0.943), indicating that this item has the greatest impact on overall eWOM. Businesses can collaborate with influencers or experts, inviting them to write or share detailed reviews and usage experiences of the product. These reviews can be widely disseminated on social media. Additionally, showcasing real-life usage cases or success stories on the product page can help consumers see the product in action and its effectiveness, thereby increasing their confidence in making a purchase.

Based on the results of SEM, improving dynamic capability can reduce perceived risk and increase customer loyalty. DC01 (I believe the e-commerce platform will be committed to improving quality) has the lowest mean score (5.21), indicating that consumers have low confidence in the platform's efforts to enhance quality. To address this, businesses can implement regular Quality Improvement Months, inviting consumers to participate and publicizing specific improvement measures and results. For example, they could showcase new quality inspection processes or technological upgrades and provide detailed quality inspection reports on product pages to ensure transparency in product quality information. DC02 (I believe that the e-commerce platform will continue to improve the reliability of its products and services) has the lowest standard deviation (1.287), indicating that consumers have a consistent view of this item, and it is very important to them. Businesses can offer reliable guarantee services for specific products, such as extended warranties and free repairs, to increase consumer trust. DC04 (I believe that the e-commerce platform will continuously conduct surveys to understand the satisfaction levels of existing customers) has the highest factor loading (0.892), indicating that this item has the greatest impact on overall dynamic capability. To reinforce this trust, businesses can regularly send consumers updates and tips on privacy protection. For example, they could remind consumers how to secure their accounts and inform them of new measures the platform is taking to protect their data.

PR04 (I believe that registering on this platform carries risks) has the highest mean score (4.00), indicating that consumers perceive a high risk in registering on the platform. To address this, businesses can enhance account security by implementing multi-factor authentication (MFA) methods, such as two-factor authentication (2FA) and CAPTCHA verification during the registration process. PR01 (I believe that the platform may not operate smoothly) has the lowest standard deviation (1.562), indicating that consumers have a consistent view of this item. Businesses can establish a real-time system status notification feature, allowing consumers to check the platform's operational status at any time. This transparency can increase consumer trust and confidence in the platform's reliability. PR03 (I believe that there is a possibility of encountering issues during the operation of the platform) has the highest factor loading (0.892), indicating that this item has the greatest impact on overall perceived risk. To address these concerns, businesses can conduct regular third-party security audits and make the results public. This approach demonstrates the platform's commitment to data protection and reassures consumers of its efforts and achievements in safeguarding their data.

This study includes four main research limitations: research methodology, research framework, research subjects, and research period. Regarding the research methodology, this study uses descriptive statistical analysis, factor analysis,

reliability analysis, and structural equation modeling, among other multivariate analysis tools. It is recommended that future research use other multivariate analysis tools, such as hierarchical regression analysis, MANOVA, or ANOVA. Additionally, qualitative research methods, such as observation, interviews, or field studies, could be further utilized.

For the research framework, this study includes eWOM, dynamic capability, perceived risk, and customer loyalty. Future research could consider other dimensions, such as environmental factors, sustainability, and customer satisfaction. The primary research subjects of this study are consumers with experience in cross-border e-commerce. Future research could focus on specific items or products, or could evaluate perspectives from the corporate side, such as employees' perceptions. The research period for this study was from May to June 2024. It is recommended that future research extend the study period to analyze the effects over different years.

## Author Contributions

Conceptualization, C.-F.C. and H.-C.C.; Methodology, H.-C.C.; Software, C.-F.C.; Validation, S.-N.L.; Formal analysis, C.-F.C.; Investigation, H.-C.C.; Resources, S.-N.L.; Data curation, H.-C.C.; Writing—original draft preparation, H.-C.C. and S.-N.L.; Writing—review and editing, C.-F.C. and J.-L.C.; Visualization, H.-C.C. and S.-N.L.; Supervision, C.-F.C.; Project administration, C.-F.C. All authors have read and agreed to the published version of the manuscript.

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## Institutional Review Board Statement

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

## Informed Consent Statement

Informed consent was obtained from all subjects involved in the study. Participation in the questionnaire was entirely voluntary and anonymous.

## Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request. The data are not publicly available due to privacy considerations.

## Conflicts of Interest

The authors declare no conflict of interest.

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