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Beyond Loyalty as an Outcome: A Fuzzy DEMATEL Analysis of Brand-Related Constructs in Online FMCG Retailing

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ABSTRACT: This study aims to identify the influence structure among brand-related factors on retail platforms, with a focus on Snapp Market. In the digital environment, brand constructs—including Brand Awareness, Brand Equity, Customer Satisfaction, Relationship Commitment, Brand Trust, and Brand Loyalty—form an interconnected network, and understanding their driving and influenced roles requires systemic analysis. Despite extensive research on relationships among these factors, a theoretical gap remains regarding their influence structure and the differentiation of driving from effect variables in online FMCG retailing in Iran. The study is applied in terms of purpose and descriptive-survey in terms of data collection. Data were collected through a Pairwise-Comparison Questionnaire completed by 16 experts in digital marketing and branding at Snapp Market. The relationships among the variables were analyzed using Fuzzy DEMATEL. The results showed that Customer Satisfaction and Brand Loyalty, with positive D−R values, were classified as Cause/Driving Variables. In contrast, Brand Awareness, Brand Equity, Relationship Commitment, and Brand Trust, with negative D−R values, were classified as Effect Variables. Customer Satisfaction emerged as the strongest driving factor, while Brand Equity exhibited the most negative D−R value and was therefore the most strongly influenced factor. Brand Trust was positioned close to the cause–effect boundary. The findings indicate that brand development on online retail platforms is better understood as an interconnected influence system rather than a linear sequence. The driving role of Customer Satisfaction and the active position of Brand Loyalty suggest that managerial attention should extend beyond treating loyalty solely as an end outcome. By providing an influence map, this study helps platform managers prioritize branding actions and allocate resources.

KEYWORDS: Brand-Related Factors, Customer–Brand Relationships, Online FMCG Retailing, Fuzzy DEMATEL, Influence Structure

INTRODUCTION

Technological developments over the past two decades have fundamentally transformed the nature of retailing. What was once dependent on physical store environments, face-to-face interactions between sellers and customers, and direct sensory experiences of products is now reproduced through digital platforms and software-based interfaces (Sang & Cuong, 2025). In emerging economies, particularly Iran, the expansion of online retail platforms for Fast-Moving Consumer Goods (FMCGs) has been occurring at a remarkable pace, such that these platforms' share of household shopping baskets is no longer a peripheral option but has become a major and competitive channel. In this environment, a brand is no longer merely a name or trademark; rather, it has become a set of interrelated cognitive, affective, and relational constructs that shape consumer behavior at every digital touchpoint (Peña-García & ter Horst, 2025). However, the existing literature has largely examined these constructs individually and through linear models, and there is still no clear understanding of how these factors influence one another in the context of online retailing or which factors function as driving variables and which as effect variables (Fluhrer & Brahm, 2025).

Online FMCG retailing creates conditions that differ from those of traditional retailing because of the non-face-to-face nature of interactions and customers' greater reliance on experiences and information provided through digital environments. In such settings, brand experience and Brand Equity can influence customer loyalty through the reinforcement of Brand Trust and brand associations; likewise, satisfaction, perceived value, and trust are regarded as important factors in the formation of electronic loyalty and the continuation of purchasing behavior in e-commerce environments (Sang & Cuong, 2025; Lan et al., 2025). However, the central issue is that these constructs form an interconnected network in practice, and their influences on one another are not unidirectional. For example, trust may precede the formation of commitment, satisfaction may contribute to strengthening Brand Equity, and loyalty has frequently been examined as an outcome within such relational processes. Although previous studies have confirmed correlations among these variables, they have generally not identified the direction, intensity, and causal structure of these relationships in the specific context of online platforms (Alagarsamy et al., 2026). Consequently, a significant theoretical and practical gap exists in this area: platform managers know that these factors are "important," but they do not know which of them should receive investment to generate the greatest systemic return through their effects on other factors.

The importance of this issue lies in the fact that resource-allocation decisions in online retail platforms, unlike in traditional settings, should be based on an understanding of the structural relationships among brand constructs rather than on intuition or the apparent importance of individual variables. If a variable occupies a driving position within the network, improving it may generate broader effects across the system; by contrast, focusing primarily on highly influenced variables may produce more limited systemic effects (Abadar & Omidi, 2026). From this perspective, developing a cause–effect influence model of the relationships among brand factors is a strategic necessity for the efficient management of scarce marketing resources. Moreover, the dynamic and multilayered nature of consumer–brand relationships in digital environments necessitates the adoption of systemic analytical approaches that can model relationships simultaneously and as a network rather than reducing them to linear relationships. Fuzzy DEMATEL is among the methods developed for this purpose: identifying the causal structure, distinguishing cause and effect variables, and mapping relationships of influence and susceptibility based on expert knowledge.

The necessity of the present study can be explained at three levels. At the theoretical level, this study contributes to completing the understanding of digital correlational by providing a systemic cause–effect representation of the relationships among key brand constructs in online retailing; an area of literature that has thus far focused primarily on examining pairwise correlational relationships among variables and has neglected the causal structure of the network of influencing factors. At the contextual level, focusing on Snapp Market as one of the major players in online FMCG retailing in Iran provides an opportunity to understand the local mechanisms of brand formation and management in a market whose cultural, economic, and technological characteristics differ significantly from those of the contexts examined in Western studies. At the practical level, the findings of this study can serve as a basis for the strategic decision-making of managers of this platform. Specifically, by identifying driving and effect variables, the study determines which areas may offer greater leverage within the overall brand network.

Accordingly, the present study seeks to answer the fundamental question of how the causal pattern of relationships among brand factors—including Brand Awareness, Brand Equity, Customer Satisfaction, Relationship Commitment, Brand Trust, and Brand Loyalty—is structured on online FMCG retail platforms, and which factors in this network function as Cause / Driving Variables and which function as Effect Variables. The main objective of this study is to develop this causal model using Fuzzy DEMATEL and based on the judgments of experts in branding and retailing. The ultimate outcome of the study is a structural roadmap that enables managers to allocate their limited resources purposefully in a manner that generates the greatest impact on the strength and sustainability of the overall brand relationship network.

LITERATURE REVIEW

1. Brand and Its Conceptual Transformation in the Digital Environment

A brand can be understood as a set of associations, perceptions, and experiences that develop in consumers' minds in relation to a name, symbol, or organization and gradually become a strategic asset for the firm. In the classical marketing literature, a brand was primarily viewed as a means of differentiation, reducing perceived risk, and fostering loyalty, while the brand-building process was generally considered unidirectional, moving from the firm toward the consumer (Chawla et al., 2025). However, the emergence of digital technologies and the expansion of online retail platforms have fundamentally transformed this traditional view. In the digital environment, a brand is no longer merely the outcome of controlled advertising messages; rather, it is shaped through continuous interactions among consumers, the platform, user-generated content, and actual purchase experiences. In other words, the brand in the digital context has become a dynamic and relational entity whose quality is determined not by a single message, but by the aggregation of multiple and sometimes uncontrollable touchpoints.

This conceptual transformation has important theoretical implications. First, although brand-related constructs remain conceptually distinct, recent approaches are less likely to treat them as independent and isolated variables. Instead, experience, satisfaction, trust, commitment, engagement, and customer loyalty are interconnected through a set of direct, indirect, and mediating relationships, forming a multidimensional structure of the customer–brand relationship (Adarok, 2025; Uzir et al., 2025). Second, the consumer's role has evolved from that of a passive recipient of value to an active co-creator of value, such that users' evaluations, opinions, and published experiences have become an integral part of brand identity (Diaz-Soloaga et al., 2023). Third, in the absence of physical contact with products and sellers, trust-based constructs have gained increased importance because consumers must make their purchase decisions on the basis of information provided through the platform (Leone de Castris, 2025). These three transformations provide a theoretical basis for rethinking traditional brand-management models and developing frameworks that are aligned with the requirements of online retailing.

2. Brand-Related Factors in Online Retailing

The brand-management literature has identified a set of cognitive, evaluative, and relational constructs associated with the formation and strengthening of customer–brand relationships. In the context of online retailing, recent studies have also emphasized the importance of constructs such as Brand Equity, Brand Trust, Customer Satisfaction, and Brand Loyalty in the formation and continuation of customer–brand relationships (Sang & Cuong, 2025; Taheri et al., 2024; Hassan et al., 2025; Zhou & Salleh Hudin, 2025). Accordingly, the present study focuses on six factors: Brand Awareness, Brand Equity, Customer Satisfaction, Relationship Commitment, Brand Trust, and Brand Loyalty. The following sections briefly conceptualize and explain each of these constructs.

2.1. Brand Awareness

Brand Awareness refers to the extent to which consumers are able to recognize and recall a brand across different purchase situations. Awareness represents the most fundamental level of the consumer–brand relationship because, unless a brand is present in the consumer's consideration set, no evaluation, preference, or loyalty can be formed (Mohanty & Swain, 2025). In the digital environment, Brand Awareness has acquired additional dimensions. Presence in search results, visibility on social media, repeated exposure through applications, and targeted advertising all contribute to the continuous reinforcement and reconstruction of Brand Awareness. However, Brand Awareness alone is not sufficient for brand success and primarily functions as a facilitating factor or an outcome of other constructs (Hardini et al., 2026).

Empirical evidence also indicates an association between Brand Awareness and other brand-related perceptions and outcomes. Alam (2026) showed that, in online retailing, shopping convenience can strengthen Brand Awareness and perceived quality, and that these factors are associated with attitudinal loyalty through brand associations. Therefore, Brand Awareness should not be viewed merely as an independent construct; rather, it should be examined in relation to other factors affecting the customer–brand relationship. Consistent with this perspective, Hardini et al. (2026) also emphasize that Brand Awareness alone is not sufficient for brand success and may play different roles in relation to other brand constructs.

2.2. Brand Equity

Brand Equity refers to the added value that a brand name provides to a product or service beyond its purely functional value. In the branding literature, this construct is regarded as multidimensional and is formed through customers' accumulated perceptions and evaluations of a brand; it is also recognized as one of the most important intangible assets of a firm (Magdy, 2026).

In online retailing, Brand Equity implies that customers may continue to choose a particular platform or brand despite the abundance of alternative options and the low switching costs between sellers, and may even be willing to pay a higher price. Empirical evidence also indicates that Brand Equity develops in relation to other constructs associated with customer experience and customer–brand relationships. Troiville (2024) examined the relationship between retailer Brand Equity and customer loyalty as a network of relationships among constructs and showed that attitudes toward the retailer and word-of-mouth communications may play mediating roles in this relationship. Similarly, Sang and Cuong (2025), in an e-commerce context, showed that brand experience can strengthen Brand Equity and that Brand Trust mediates the relationship between brand experience and loyalty. These findings indicate that Brand Equity cannot be examined independently of customers' other perceptions, experiences, and relational constructs, and that determining its position within the network of brand relationships requires simultaneous consideration of its relationships with other factors.

2.3. Customer Satisfaction

Customer Satisfaction refers to the customer's overall evaluation of the purchase and consumption experience, resulting from a comparison between expectations and actual performance. Satisfaction is an experience-based and situational construct that, in online retailing, may be influenced by various aspects of the customer experience, including the quality of delivered products, the speed and accuracy of delivery, the ease of the ordering process, the quality of after-sales service, and the transparency of information. The theoretical importance of satisfaction lies in the fact that, in the consumer behavior literature, it has been discussed in relation to important relational outcomes such as trust, commitment, and loyalty (Radovilsky & Hegde, 2024).

Empirical evidence from the e-commerce context also indicates an association between satisfaction and other relational constructs. Iqbal et al. (2023) showed that service quality and trust are important factors associated with the formation of customer satisfaction, while satisfaction, trust, and loyalty are embedded in a set of interconnected relationships. These findings suggest that Customer Satisfaction should not be viewed merely as the final outcome of the purchase experience; rather, its significance emerges through its relationships with other factors and relational outcomes in the customer–brand relationship. Accordingly, examining the position of Customer Satisfaction alongside other brand-related constructs can contribute to a better understanding of the structure of relationships among the factors shaping customer–brand relationships in the digital environment.

2.4. Relationship Commitment

Relationship Commitment refers to a customer's enduring willingness to maintain and continue a relationship with a brand and is commonly conceptualized in terms of affective and calculative commitment. Affective commitment concerns the customer's emotional attachment to and identification with the brand, whereas calculative commitment is based on a rational evaluation of the costs and benefits of remaining in the relationship (Casidy & Mohan, 2025). In online retailing, where customers can switch relatively easily between different platforms and brands, Relationship Commitment is particularly important because it reflects the customer's willingness to sustain the relationship with a brand beyond a temporary evaluation or experience.

Empirical evidence also indicates that commitment is associated with other relational constructs, including trust, satisfaction, and loyalty. Wong (2023), in a study of smartphone users, showed that Brand Trust is associated with Brand Commitment, while commitment, together with brand love, is associated with loyalty. Similarly, Amoroso and Ackaradejruangsri (2024) showed that Brand Commitment is associated with satisfaction and loyalty and can play a role in sustaining the customer–brand relationship. These findings indicate that commitment should not be treated as synonymous with loyalty; rather, commitment reflects the willingness to maintain and continue the relationship and derives its significance from its interaction with other relational constructs. Accordingly, examining Relationship Commitment alongside trust, satisfaction, and loyalty can contribute to a better understanding of its position within the structure of relationships among brand-related factors.

2.5. Brand Trust

Brand Trust refers to the consumer's reassuring expectation that a brand will continue to possess the ability and intention to fulfill its promises in future interactions and act in the consumer's best interests. Trust consists of two main components: competence, which concerns the brand's technical and functional capabilities, and benevolence, which concerns the brand's goodwill and intentions toward the consumer (Makwana, 2026). In digital environments, factors such as uncertainty, information asymmetry, and perceived risk may increase the importance of trust in the customer–brand relationship because customers often make purchase decisions before receiving the product and without having the opportunity to fully evaluate it.

Conceptually, Brand Trust should not be equated with Customer Satisfaction. Satisfaction primarily concerns the customer's evaluation of the experience and performance received, whereas trust concerns the customer's expectations regarding the brand's reliability, competence, and benevolence in future interactions. Empirical evidence also indicates that trust is associated with other relational constructs in digital environments, particularly loyalty. Mofokeng (2023), in the context of online retailing, showed that trust is associated with customer loyalty and may play a mediating role in the relationship between certain online-store performance factors and loyalty. Similarly, Sohaib and Han (2023) showed that Brand Trust is positively associated with loyalty in digital environments and may play a mediating role in transmitting the effects of digital marketing activities to loyalty. In the same vein, Shahzad et al. (2024), in an e-commerce context, showed that digital interaction quality may be associated with Brand Loyalty through constructs including trust, experience, and electronic word-of-mouth communication. These findings indicate that Brand Trust has been examined in different positions within the network of brand relationships and may be associated with both antecedent factors and relational outcomes. Accordingly, examining its position alongside other brand-related factors can contribute to a better understanding of the structure of relationships among these constructs.

2.6. Brand Loyalty

Brand Loyalty can be defined as a customer's enduring willingness to repurchase from a brand and resistance to competing alternatives and competitors' efforts to induce switching. Loyalty is commonly examined at two levels: attitudinal and behavioral. Behavioral loyalty refers to repeated purchasing, whereas attitudinal loyalty reflects the customer's positive attitude and psychological preference toward the brand. In the brand-management literature, loyalty is regarded as one of the most important desirable outcomes of the customer–brand relationship and is associated with outcomes such as lower customer-acquisition costs, higher customer lifetime value, and sustainable competitive advantage (Castaldo et al., 2026).

In digital environments, Brand Loyalty is not limited to repeated purchasing and may also be manifested through repurchase intentions, resistance to brand switching, brand recommendation, and willingness to pay a higher price. Empirical evidence indicates that loyalty is associated with a set of cognitive, experiential, and relational factors and that the pathways leading to loyalty are not necessarily identical. Liang (2022), by examining brand experience, satisfaction, trust, and commitment simultaneously, showed that the type and strength of the relationships between these factors and different dimensions of loyalty varied. Satisfaction and trust were more important in the formation of attitudinal loyalty, whereas experience and commitment played more prominent roles in relation to behavioral loyalty. Moreover, when these factors were entered into the model simultaneously, some of their effects were transmitted through other constructs.

In the digital environment, Sohaib and Han (2023) also confirmed a positive association between trust and loyalty, while Shahzad et al. (2024) showed that, in e-commerce, trust, experience, and electronic word-of-mouth communication may play a role in transmitting the effects of digital interaction quality to loyalty. In addition, Troiville (2024) showed that the relationship between retailer Brand Equity and loyalty may also be explained through attitudes and word-of-mouth communication. These findings indicate that Brand Loyalty is associated with a set of constructs related to customer experience and customer–brand relationships, and that its position cannot be determined solely on the basis of pairwise relationships between variables.

3. CAUSAL RELATIONSHIPS AMONG BRAND FACTORS: FROM A LINEAR TO A SYSTEMIC PERSPECTIVE

Recent research in online food retailing and food-delivery platforms has gradually moved beyond purely technological perspectives toward examining consumer behavior from a branding perspective. Ruokolainen (2026), in a qualitative–quantitative study of a multi-brand cloud kitchen in Finland operating through the Wolt platform, examined the effectiveness of low-value coupon campaigns in retaining customers. The results showed that the overall coupon redemption rate was moderate, whereas the umbrella brand achieved a higher redemption rate. In particular, the study showed that even dissatisfied customers may redeem coupons when trust is successfully restored, highlighting the importance of branding and trust in service recovery. Nugroho et al. (2025), in a quantitative study of 210 members of Generation Z in Indonesia, investigated the factors affecting intention to reuse the GrabFood application using partial least squares structural equation modeling. The findings showed that brand personality, perceived usefulness, and promotional discounts had significant effects on reuse intention, whereas ease of use did not have a direct effect. This finding highlights the potentially stronger role of emotional brand-related connections than functional convenience among digitally oriented consumers. Yan et al. (2024), focusing on the effects of online food-delivery services on restaurant performance in the Chinese market, used PLS-SEM and data from 220 respondents and found that basic services and click-based advertising had direct and positive effects on restaurant performance, whereas discount services did not have a significant effect. Taken together, these studies indicate that branding, trust, reuse intention, promotional incentives, and service-related factors may be associated with consumer and performance outcomes in different ways across online food-delivery contexts. Such context-dependent patterns further support the need for analytical approaches that move beyond isolated linear relationships. From a behavioral-economics perspective, this finding is noteworthy because it provides a basis for comparison with the findings of Nugroho et al. (2025) concerning the effect of discounts from a different perspective and in a different context.

Previous research in brand management has examined the relationships among these constructs primarily through linear and sequential models. Such models commonly depict a sequence in which awareness precedes the formation of Brand Equity, satisfaction leads to trust, trust strengthens commitment, and commitment and trust ultimately lead to loyalty (Ibrahimzadeh et al., 2025). Although this sequential representation offers simplicity and high testability, it does not fully capture the complexity of the relationships among these constructs. In practice, relationships among brand-related factors may be reciprocal, feedback-based, and networked. For example, satisfaction may strengthen trust, while trust, by reducing perceived risk, may increase the likelihood of satisfaction with a subsequent purchase experience. Similarly, Brand Equity may function both as an outcome of loyalty and as a driving factor of loyalty (Sheykhan et al., 2024). This networked and feedback-based nature highlights the relevance of systemic analytical approaches and, more specifically, multi-criteria decision-making techniques such as Fuzzy DEMATEL.

Unlike regression models or structural equation models, which typically focus on testing pre-specified hypotheses, DEMATEL enables the identification of an influence structure among variables, the classification of variables into cause and effect groups, and the mapping of influence and susceptibility relationships based on expert knowledge. Moreover, incorporating fuzzy logic into the technique allows ambiguity and uncertainty in human judgments to be addressed, thereby making the analytical process more consistent with the conditions of decision-making. Accordingly, Fuzzy DEMATEL is appropriate for the nature of the present research problem, in which the objective is not to test a specific relationship between two variables, but rather to identify the overall pattern of relationships among the brand-related factors within an interconnected system.

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4. ONLINE FMCG RETAILING AND THE SNAPP MARKET CONTEXT

Online retailing in Iran has experienced substantial growth in recent years, although the extent of this growth varies across product categories (Hamidi & Madani, 2024). Fast-Moving Consumer Goods (FMCGs), owing to their frequent purchase, relatively low prices, and everyday consumption characteristics, differ in important respects from durable goods, creating specific challenges for brand management in this domain. On the one hand, low switching costs and the abundance of alternatives can make loyalty fragile; on the other hand, the routine and repetitive nature of purchasing can facilitate habit formation and behavioral loyalty (Pillay, 2025). As one of the major players in Iran's online FMCG retail market, Snapp provides an appropriate context for examining the influence structure among brand-related factors. In this setting, the quality of the digital experience, the efficiency of logistics services, the quality and transparency of information, and the way the platform interacts with customers are among the factors associated with customers' experiences, satisfaction, and evaluations of the platform (Basu et al., 2024; Yang et al., 2024).

The importance of examining this context lies in the fact that the cultural, economic, and technological characteristics of the Iranian market differ significantly from those of the contexts examined in much of the predominantly Western literature, raising important questions about the generalizability of findings from those contexts to Iran. Accordingly, examining the cause–effect influence structure of brand-related factors in Snapp Market can contribute to addressing the existing theoretical gap while providing context-specific and practically relevant evidence for managers in this domain.

5. SYNTHESIS OF THEORETICAL FOUNDATIONS AND RESEARCH GAP

The review of the theoretical foundations and previous studies indicates that Brand Awareness, Brand Equity, Customer Satisfaction, Relationship Commitment, Brand Trust, and Brand Loyalty are among the important constructs for explaining the customer–brand relationship. Previous studies have reported various relationships among these constructs. Satisfaction and trust, for example, have been associated with loyalty in some studies; trust has played a mediating role between experience and loyalty in certain models; commitment has been examined in relation to relationship continuity and loyalty; and the relationship between Brand Equity and loyalty has, in some studies, been explained through constructs such as attitudes and word-of-mouth communication. Although this body of evidence confirms the existence of relationships among the constructs of interest, it does not necessarily determine their relative positions within the broader network of brand relationships.

From this perspective, the research gap addressed by the present study should not be understood as a lack of research on any individual construct. Rather, the central issue is the limited understanding of the simultaneous structure of relationships among these constructs. Most previous studies have examined specific, pre-specified relationships in terms of direct effects, indirect effects, or mediation. These approaches are valuable for testing specific theoretical relationships, but their findings do not necessarily reveal which factors exert greater influence or are more strongly influenced when multiple factors are considered simultaneously within a single system, nor which constructs have stronger interactions with the system as a whole. For example, studies such as Shahzad et al. (2024) and Troiville (2024) examined specific relationships among constructs related to trust, experience, Brand Equity, and loyalty, but their objectives did not involve determining the overall structure of influence and influence received among the six factors examined in the present study.

This gap becomes particularly important in the context of online FMCG retailing. A substantial proportion of the existing evidence has been generated in contexts such as general e-commerce, smartphones, or other digital services and environments (Sohaib & Han, 2023; Wong, 2023; Shahzad et al., 2024). In contrast, online FMCG retailing involves repeated customer interactions with the platform, from product search and selection to payment, delivery, and after-sales service, and these successive experiences may be associated with customers' subsequent evaluations and relationships with the brand. Existing evidence has also highlighted the importance of factors such as delivery, security, convenience, experience, and trust in shaping relational outcomes in online retailing (Mofokeng, 2023). Therefore, examining brand-related constructs simultaneously in such a context can provide a more precise understanding of their relative positions within an interconnected structure.

Accordingly, the present study focuses on the Snapp Market context and seeks to identify the structure of relationships among Brand Awareness, Brand Equity, Customer Satisfaction, Relationship Commitment, Brand Trust, and Brand Loyalty. Using Fuzzy DEMATEL, the study examines the direction and intensity of mutual influences among these factors, distinguishes driving factors from influenced (effect) factors, and maps the relationships among them. In this way, rather than focusing solely on testing individual, pre-specified relationships, the study provides a structural representation of the relative positions of brand-related factors and the relationships among them. This representation can contribute to theoretical understanding of the structure of brand relationships and provide a basis for prioritizing actions and allocating marketing resources more purposefully in online retailing.

MATERIALS AND METHODS

In terms of its purpose, this study is applied, and in terms of data collection and analysis, it is descriptive-survey research. The theoretical component of the study was developed using documentary and library research methods, while quantitative data were collected using a Pairwise-Comparison Questionnaire. Given the main objective of the study, the research questions are as follows:

1. What are the key brand-related factors in the digital environment?
2. What is the cause–effect influence structure among these factors using the Fuzzy DEMATEL method?

1. Statistical Population and Sample

The statistical population of the quantitative component of this study consisted of experts, senior managers, and specialists in digital marketing and branding at the Snapp Market platform, as well as university faculty members with expertise in this field. Given the nature of multicriteria decision-making (MCDM) techniques, which require expert judgments rather than large sample sizes, 16 experts were selected using purposive sampling. Given the expert-judgment basis of the Fuzzy DEMATEL method, the selected sample was considered appropriate for the analytical purpose of the study.

2. Data Analysis Method (Fuzzy DEMATEL)

Theoretical Foundation

Fuzzy set theory provides an effective tool for addressing the ambiguity inherent in human thinking and expression during decision-making processes. In practice, linguistic variables expressed by decision-makers can be represented using fuzzy numbers, particularly Triangular Fuzzy Numbers (Wang et al., 2009). The implementation steps of the Fuzzy DEMATEL technique in this study are described below.

Step 1: Designing the Fuzzy Linguistic Scale

To address the ambiguity inherent in human evaluations, the linguistic variable of "influence" was represented using five linguistic terms. The corresponding Triangular Fuzzy Numbers (l, m, r) for these terms are presented in Table 1.

Table 1. Linguistic Variables and Their Corresponding Triangular Fuzzy Numbers

Linguistic term	Crisp value	Triangular fuzzy number (l, m, r)
Very high influence	4	(0.75, 1, 1)
High influence	3	(0.50, 0.75, 1)
Moderate influence	2	(0.25, 0.50, 0.75)
Low influence	1	(0, 0.25, 0.50)
No influence	0	(0, 0, 0.25)

Step 2: Construction of the Fuzzy Direct-Relation Matrix

Based on the experts' judgments and using the linguistic scale, pairwise comparisons were conducted to evaluate the degree of influence of each factor on the others. The experts' fuzzy judgments were subsequently aggregated to obtain the group Fuzzy Direct-Relation Matrix:

$$\widetilde{D} = [\tilde{d}_{ij}]_{n\times n}$$

where $\tilde{d}_{ij} = (d_{ij}^l, d_{ij}^m, d_{ij}^r)$ indicates the degree of influence of factor i on factor j.

Although the linguistic term "No influence" was represented by the triangular fuzzy number $(0, 0, 0.25)$*, self-influence was not considered in the DEMATEL direct-relation matrix; therefore, all diagonal elements* $(i = j)$ *were set to* $(0, 0, 0)$.

Step 3: Normalization of the Fuzzy Direct-Relation Matrix

The Fuzzy Normalized Direct-Relation Matrix $(\widetilde{N})$ is calculated as:

$$\widetilde{N} = \frac{\widetilde{D}}{u}$$

where the normalization coefficient u is determined as:

$$u = \max_i \left(\sum_{j=1}^{n} d_{ij}^r \right)$$

For the present dataset, the maximum row sum of the upper bounds was 4.20; therefore, $u = 4.20$.

The normalized matrix is expressed as:

$$\widetilde{N} = [\tilde{n}_{ij}]_{n\times n}$$

where

$$\tilde{n}_{ij} = \left(\frac{d_{ij}^l}{u}, \frac{d_{ij}^m}{u}, \frac{d_{ij}^r}{u} \right) = (n_{ij}^l, n_{ij}^m, n_{ij}^r)$$

Step 4: Calculation of the Fuzzy Total-Relation Matrix

Once the normalized matrix has been obtained, the Fuzzy Total-Relation Matrix is calculated separately for the lower, middle, and upper components:

$$T^l = N^l (I - N^l)^{-1}$$
$$T^m = N^m (I - N^m)^{-1}$$
$$T^r = N^r (I - N^r)^{-1}$$

where I denotes the identity matrix. The Fuzzy Total-Relation Matrix is then expressed as:

$$\tilde{T} = [\tilde{t}_{ij}]_{n\times n}$$

where:

$$\tilde{t}_{ij} = (t_{ij}^l, t_{ij}^m, t_{ij}^r)$$

Step 5: Defuzzification of Values

The Fuzzy Total-Relation Matrix $(\tilde{T})$ was transformed into a crisp total-relation matrix using the following weighted defuzzification formula:

$$t_{ij} = \frac{t_{ij}^l + 2t_{ij}^m + t_{ij}^r}{4}$$

Accordingly, the defuzzified matrix is expressed as:

$$T = [t_{ij}]_{n\times n}$$

Step 6: Determination of the Threshold Value

To eliminate weaker relationships and retain the more meaningful influence relationships, the threshold value $(\alpha)$was calculated as the arithmetic mean of all entries in the defuzzified total-relation matrix:

$$\alpha = \frac{\sum_{i=1}^{N} \sum_{j=1}^{N} t_{ij}}{N^2}$$

For the present study, the threshold value was calculated as:

$$\alpha \approx 0.084$$

Relationships satisfying

$$t_{ij} \geq \alpha$$

were retained as significant relationships for the causal network representation, whereas relationships below the threshold were omitted.

Step 7: Extraction of Cause–Effect Indicators and Analysis of Results

Based on the complete defuzzified total-relation matrix $T = [t_{ij}]_{n \times n}$, the sum of the elements in each row represents the total influence exerted by each factor (D), whereas the sum of the elements in each column represents the total influence received by each factor (R):

$$D_i = \sum_{j=1}^{n} t_{ij}$$

$$R_i = \sum_{j=1}^{n} t_{ji}$$

The index $D_i + R_i$represents the prominence or overall degree of involvement of factor $i$within the system, whereas $D_i - R_i$represents its net influence. If $D_i - R_i > 0$, the factor is classified as a Cause/Driving Variable; if $D_i - R_i < 0$, it is classified as an Effect Variable.

Finally, the cause–effect diagram is constructed by plotting $D_i + R_i$on the horizontal axis and $D_i - R_i$on the vertical axis.

The thresholded matrix was used only for visualizing meaningful directional relationships and was not used in calculating the $D$and Rindices.

RESULTS

Analyzing research data is a structured process through which, after data collection and the calculation of variable values, the relationships among the variables are examined to address the research questions. This section presents the outputs obtained from the analysis of the collected data.

1. Brand-Related Factors in Snapp Market

Based on a systematic review of the theoretical foundations and prior research, six main brand-related factors were identified and included as the variables of the model: (1) Brand Awareness, (2) Brand Equity, (3) Customer Satisfaction, (4) Relationship Commitment, (5) Brand Trust, and (6) Brand Loyalty. To examine the cause–effect influence structure among these variables, the Fuzzy DEMATEL multi-criteria decision-making approach was employed based on the judgments of 16 experts with relevant expertise in digital marketing, branding, and online retailing.

2. Causal Model of Brand-Related Factors: Fuzzy DEMATEL Analysis

To avoid repeating the mathematical foundations and basic methodological procedures, this section presents only the results and computational outputs of each step of the Fuzzy DEMATEL analysis that contribute to identifying the cause–effect influence structure among the variables in the context of Snapp Market.

First, expert judgments were elicited using linguistic variables ranging from “No Influence” to “Very High Influence” and were converted into Triangular Fuzzy Numbers (Table 1). Subsequently, by aggregating the judgments of the experts, the Fuzzy Direct-Relation Matrix was constructed (Table 2).

Table 2. Fuzzy Direct-Relation Matrix

Variables	Brand Awareness	Brand Equity	Customer Satisfaction	Relationship Commitment	Brand Trust	Brand Loyalty
Brand Awareness	(0, 0, 0)	(0.03, 0.27,0.52)	(0, 0.03, 0.28)	(0.02, 0.22, 0.47)	(0, 0.03, 0.28)	(0, 0.05, 0.30)
Brand Equity	(0, 0.03, 0.28)	(0, 0, 0)	(0, 0.08, 0.33)	(0, 0, 0.25)	(0, 0.05, 0.30)	(0, 0.02, 0.27)
Customer Satisfaction	(0.50, 0.75, 0.98)	(0.75, 1,1)	(0, 0, 0)	(0.70, 0.95, 1)	(0.25, 0.50, 0.75)	(0, 0.22, 0.47)
Relationship Commitment	(0, 0.05, 0.30)	(0.03, 0.25, 0.50)	(0, 0, 0.25)	(0, 0, 0)	(0, 0.03, 0.28)	(0, 0.07, 00.32)
Brand Trust	(0, 0.25, 0.50)	(0.32, 0.57, 0.82)	(0, 0.02, 0.27)	(0.03, 0.23, 0.48)	(0, 0, 0)	(0, 0.03, 0.28)
Brand Loyalty	(0.03, 0.25,0.50)	(0.53, 0.78, 0.98)	(0, 0.02, 0.27)	(0.05, 0.23, 0.48)	(0.25, 0.50, 0.75)	(0, 0, 0)

In the next step, the Fuzzy Normalized Direct-Relation Matrix (Table 3) was calculated, followed by the Fuzzy Total-Relation Matrix (Table 4), which captures the total direct and indirect influence among the variables.

Table 3. Fuzzy Normalized Direct-Relation Matrix

Variables	Brand Awareness	Brand Equity	Customer Satisfaction	Relationship Commitment	Brand Trust	Brand Loyalty
Brand Awareness	(0.000, 0.000, 0.000)	(0.007, 0.064, 0.124)	(0.000, 0.007, 0.067)	(0.005, 0.052, 0.112)	(0.000, 0.007, 0.067)	(0.000, 0.012, 0.071)
Brand Equity	(0.000, 0.007, 0.067)	(0.000, 0.000, 0.000)	(0.000, 0.019, 0.079)	(0.000, 0.000, 0.060)	(0.000, 0.012, 0.071)	(0.000, 0.005, 0.064)
Customer Satisfaction	(0.119, 0.179, 0.233)	(0.179, 0.238, 0.238)	(0.000, 0.000, 0.000)	(0.167, 0.226, 0.238)	(0.060, 0.119, 0.179)	(0.000, 0.052, 0.112)
Relationship Commitment	(0.000, 0.012, 0.071)	(0.007, 0.060, 0.119)	(0.000, 0.000, 0.060)	(0.000, 0.000, 0.000)	(0.000, 0.007, 0.067)	(0.000, 0.017, 0.076)
Brand Trust	(0.000, 0.060, 0.119)	(0.076, 0.136, 0.195)	(0.000, 0.005, 0.064)	(0.007, 0.055, 0.114)	(0.000, 0.000, 0.000)	(0.000, 0.007, 0.067)
Brand Loyalty	(0.007, 0.060, 0.119)	(0.126, 0.186, 0.233)	(0.000, 0.005, 0.064)	(0.012, 0.055, 0.114)	(0.060, 0.119, 0.179)	(0.000, 0.000, 0.000)

Table 4. Fuzzy Total-Relation Matrix

Variables	Brand Awareness	Brand Equity	Customer Satisfaction	Relationship Commitment	Brand Trust	Brand Loyalty
Brand Awareness	(0.000, 0.004, 0.093)	(0.007, 0.074, 0.248)	(0.000, 0.009, 0.122)	(0.005, 0.056, 0.198)	(0.000, 0.011, 0.149)	(0.000, 0.014, 0.133)
Brand Equity	(0.000, 0.012, 0.144)	(0.000, 0.009, 0.118)	(0.000, 0.019, 0.122)	(0.000, 0.006, 0.141)	(0.000, 0.015, 0.141)	(0.000, 0.006, 0.116)
Customer Satisfaction	(0.119, 0.197, 0.392)	(0.185, 0.297, 0.485)	(0.000, 0.008, 0.125)	(0.168, 0.249, 0.406)	(0.060, 0.134, 0.331)	(0.000, 0.062, 0.238)
Relationship Commitment	(0.000, 0.014, 0.152)	(0.007, 0.066, 0.233)	(0.000, 0.001, 0.111)	(0.000, 0.003, 0.088)	(0.000, 0.010, 0.142)	(0.000, 0.017, 0.131)
Brand Trust	(0.000, 0.064, 0.217)	(0.076, 0.148, 0.333)	(0.000, 0.008, 0.134)	(0.007, 0.061, 0.218)	(0.000, 0.005, 0.102)	(0.000, 0.010, 0.142)
Brand Loyalty	(0.007, 0.071, 0.245)	(0.131, 0.214, 0.408)	(0.000, 0.010, 0.152)	(0.012, 0.068, 0.246)	(0.060, 0.124, 0.285)	(0.000, 0.004, 0.098)

Table 5. Defuzzified Matrix (Crisp Values)

Variables	Brand Awareness	Brand Equity	Customer Satisfaction	Relationship Commitment	Brand Trust	Brand Loyalty
Brand Awareness	0.025	0.101	0.035	0.079	0.043	0.040
Brand Equity	0.042	0.034	0.040	0.038	0.043	0.032
Customer Satisfaction	0.226	0.316	0.035	0.268	0.165	0.090
Relationship Commitment	0.045	0.093	0.028	0.023	0.041	0.041
Brand Trust	0.086	0.176	0.037	0.087	0.028	0.041
Brand Loyalty	0.099	0.242	0.043	0.098	0.148	0.027

The Fuzzy Total-Relation Matrix (Table 4) was defuzzified using the weighted defuzzification formula $t_{ij} = (l_{ij} + 2m_{ij} + r_{ij})/4$to obtain the crisp total-relation matrix.
The threshold value (α) was calculated as the arithmetic mean of all entries in the defuzzified total-relation matrix and was determined to be 0.084. Relationships with values equal to or greater than the threshold were retained as significant, whereas weaker relationships were omitted from the causal network representation.

Table 6. Thresholded Defuzzified Matrix (Significant Relationships Based on the Threshold Value)

Variables	Brand Awareness	Brand Equity	Customer Satisfaction	Relationship Commitment	Brand Trust	Brand Loyalty
Brand Awareness	0	1	0	**0**	0	0
Brand Equity	0	0	0	0	0	0
Customer Satisfaction	1	1	0	1	1	1
Relationship Commitment	0	1	0	0	0	0
Brand Trust	1	1	0	1	0	0
Brand Loyalty	1	1	0	1	1	0

Finally, the values of Degree of Influence (D), Degree of Influence Received (R), Degree of Interaction (D + R), and Net Causal Influence (D − R) were calculated for each variable (Table 7).

Table 7. Causal Indicators of Brand-Related Factors

Variables	Degree of Influence (D)	Degree of Influence Received (R)	Prominence (D + R)	Net Causal Influence (D − R)	Role in the Model
Brand Awareness	0.323	0.523	0.846	-0.200	**Effect Variable**
Brand Equity	0.230	0.962	1.192	-0.732	**Effect Variable**
Customer Satisfaction	1.100	0.219	1.319	+0.881	**Cause / Driving Variable**
Relationship Commitment	0.272	0.594	0.865	-0.322	**Effect Variable**
Brand Trust	0.455	0.468	0.922	-0.013	**Cause / Driving Variable**
Brand Loyalty	0.657	0.271	0.928	+0.386	**Final Effect Variable**

Based on the Net Causal Influence $(D - R)$index, Customer Satisfaction and Brand Loyalty, which exhibited positive values, were classified as Cause/Driving Variables. In contrast, Brand Awareness, Brand Equity, Relationship Commitment, and Brand Trust, with negative $D - R$values, were classified as Effect Variables. Customer Satisfaction showed the highest positive net influence and therefore represented the strongest driving factor in the system, whereas Brand Equity exhibited the most negative $D - R$value and was the most strongly influenced factor. Brand Trust was positioned close to the cause–effect boundary, indicating a relatively balanced level of influence exerted and received. The structural pattern of these relationships is illustrated in Figure 1 (Final Model).

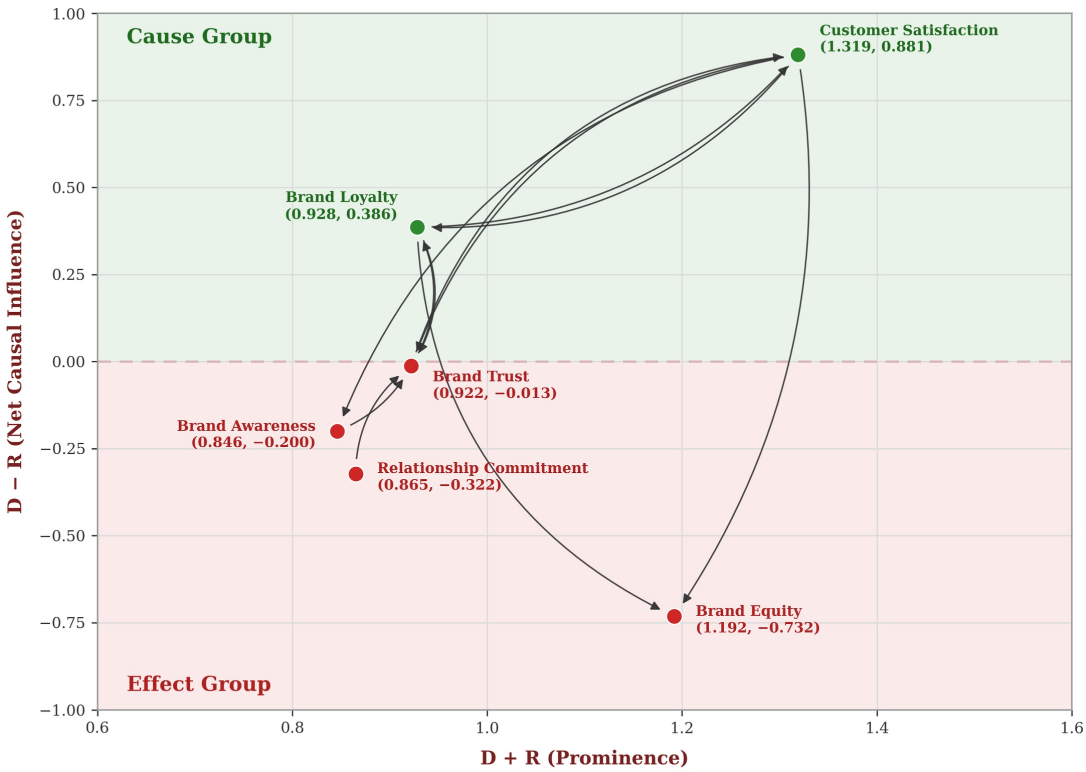

Figure 1. Cause–Effect Diagram of Brand-Related Factors in Snapp Market

In this structure, Customer Satisfaction and Brand Loyalty emerge as Cause/Driving Variables, whereas Brand Awareness, Brand Equity, Relationship Commitment, and Brand Trust are positioned within the Effect group. This configuration suggests that the relationships among brand-related factors in digital retailing are better understood as an interconnected influence structure rather than as a fixed linear sequence.

DISCUSSION

The present study examined the influence structure among brand-related factors in digital retailing, with a particular focus on Snapp Market. The Fuzzy DEMATEL analysis demonstrated that the relationships among the six examined factors do not follow a simple linear pattern but instead form an interconnected system of mutual influences. The Prominence $(D + R)$and Net Causal Influence $(D - R)$indices revealed two distinct groups within the model. Customer Satisfaction and Brand Loyalty were classified as Cause/Driving Variables, whereas Brand Awareness, Brand Equity, Relationship Commitment, and Brand Trust were positioned in the Effect group.

Among the examined factors, Customer Satisfaction exhibited the highest positive $D - R$value, indicating the strongest driving role in the system. This finding highlights the structural importance of customers' overall evaluations of their purchasing and service experiences within the online retail environment. In the context of Snapp Market, satisfaction may therefore represent an important leverage point through which broader brand-related perceptions and relationships are influenced. From a managerial perspective, this reinforces the importance of consistently delivering satisfactory customer experiences across different stages of the online purchasing process.

Brand Loyalty also exhibited a positive net causal influence and was therefore positioned within the Cause group. This finding is noteworthy because loyalty is frequently treated in the branding literature primarily as an outcome variable. In the present influence structure, however, Brand Loyalty appears to perform a more active role within the broader network of brand-related factors. Rather than being interpreted solely as the final consequence of other brand evaluations, established loyalty may also contribute to reinforcing customers' subsequent perceptions and relationships with the brand. This result further supports the systemic interpretation of brand development adopted in this study, in which the structural role of a factor cannot necessarily be inferred from its conventional position in linear models.

In contrast, Brand Awareness, Brand Equity, Relationship Commitment, and Brand Trust exhibited negative $D - R$values and were therefore classified as Effect Variables. Among these factors, Brand Equity had the most negative net causal influence, indicating that it was the most strongly influenced factor within the examined system. This result suggests that Brand Equity in the context of digital retailing may be particularly sensitive to the cumulative influence of other experiential and relational factors rather than functioning primarily as an independent driver of the system.

Brand Trust was also positioned in the Effect group; however, its $D - R$value was very close to zero (-0.013). This near-boundary position indicates a relatively balanced pattern between the influence exerted and the influence received by Brand Trust. Accordingly, Brand Trust should not be interpreted as a strongly downstream factor. Rather, its position suggests that trust remains structurally involved in the network while receiving slightly more influence than it exerts. This finding is compatible with the broader relationship-marketing perspective in which trust plays an important role in maintaining customer–brand relationships, although the present results do not position it as one of the dominant driving factors. In this respect, the findings provide a more context-specific view than a strictly linear interpretation of Commitment–Trust Theory (Morgan & Hunt, 1994).

Relationship Commitment and Brand Awareness were likewise classified as Effect Variables, indicating that within the present structure they receive more influence from the system than they exert on it. Their position suggests that these factors may develop partly as consequences of broader experiential and relational dynamics within the platform. In particular, the relatively stronger driving roles of Customer Satisfaction and Brand Loyalty indicate that the development of favorable brand perceptions cannot be understood by examining awareness, commitment, or equity in isolation.

From a practical perspective, the findings provide a structured basis for prioritizing managerial attention in online retail platforms. Because Customer Satisfaction showed the strongest driving role, initiatives aimed at improving the quality and consistency of the customer experience should remain a central managerial priority. Reliable service delivery, accurate order fulfillment, timely responsiveness, effective complaint handling, and convenient return processes can contribute to more favorable customer evaluations. At the same time, the driving position of Brand Loyalty suggests that retaining loyal customers may generate broader benefits across the brand system rather than serving only as an end objective. Consequently, loyalty-building initiatives should be viewed not merely as outcome-oriented programs but as part of a broader strategy for strengthening the overall customer–brand relationship.

The findings should nevertheless be interpreted within the methodological and contextual boundaries of the study. First, the analysis focuses on a single online FMCG platform, Snapp Market, which limits the extent to which the identified influence structure can be generalized to other digital retail contexts. Second, Fuzzy DEMATEL is based on expert judgments and therefore reflects perceived patterns of influence rather than definitive consumer-level causal effects. The results should consequently be interpreted as a structural representation of influence among the examined factors rather than as evidence of causal relationships in the strict statistical sense. Future research could test the identified relationships using customer-level data and complementary empirical approaches such as SEM or PLS-SEM. Further studies may also extend the framework by incorporating additional factors such as Perceived Risk, User Experience, and electronic Word-of-Mouth (e-WOM), as well as by comparing the influence structures observed across different digital retail platforms.

CONCLUSION

This study investigated the structure of mutual influence among six interrelated brand factors—Brand Awareness, Brand Equity, Customer Satisfaction, Relationship Commitment, Brand Trust, and Brand Loyalty—in the context of online FMCG retailing, with particular focus on Snapp Market. Using Fuzzy DEMATEL, the findings showed that these factors occupy distinct positions within the influence network rather than contributing equally to brand development. Customer Satisfaction and Brand Loyalty emerged as Cause/Driving Variables, whereas Brand Awareness, Brand Equity, Relationship Commitment, and Brand Trust were positioned within the Effect group. Among the examined factors, Customer Satisfaction exhibited the strongest positive net causal influence, while Brand Equity showed the most negative $D - R$ value and therefore represented the most strongly influenced factor in the system. Brand Trust was positioned close to the cause–effect boundary, indicating a relatively balanced pattern between influence exerted and influence received.

These findings reinforce the view that brand development in digital retailing is better understood as an interconnected system of influences than as a simple linear sequence of brand-related outcomes. The results indicate that the structural importance of a brand factor depends not only on its conceptual relevance but also on its position within the broader network of relationships. In particular, the strong driving role of Customer Satisfaction highlights the importance of customers' overall evaluations of their purchasing and service experiences. At the same time, the positioning of Brand Loyalty within the Cause group suggests that loyalty should not be interpreted solely as a terminal outcome of prior brand evaluations. Rather, established loyalty may also contribute to reinforcing other brand-related perceptions and relationships within the system. Conversely, the position of Brand Equity as the most strongly influenced factor suggests that it may emerge from the cumulative effects of broader experiential and relational dynamics within the digital retail environment.

The findings also provide a more nuanced interpretation of Brand Trust. Although trust remains an important relational factor, its slightly negative $D - R$ value indicates that, in the present structure, it receives marginally more influence than it exerts. Its position near the cause–effect boundary suggests that Brand Trust remains highly embedded in the network without functioning as one of the dominant driving factors. This result does not diminish the relational importance of trust, but rather indicates that its structural role in digital retailing may be more context-dependent than is often assumed in strictly linear relationship-marketing models.

From a managerial perspective, the findings suggest that online retailers should prioritize the factors that exert the greatest influence on the broader system. Customer Satisfaction should therefore remain a central strategic concern, supported through reliable service delivery, accurate order fulfillment, timely responsiveness, effective complaint resolution, convenient return processes, and clear communication with customers. The driving position of Brand Loyalty further suggests that retaining loyal customers may generate effects beyond repeat purchasing alone, potentially reinforcing broader brand-related perceptions and relationships. Accordingly, loyalty-building initiatives should be integrated into the wider customer experience strategy rather than treated solely as end-stage outcomes.

The findings should nevertheless be interpreted within the methodological and contextual boundaries of the study. Because the identified influence structure is derived from expert judgments and reflects the context of a single online retail platform, it should not be interpreted as definitive evidence of consumer-level causal relationships or assumed to generalize automatically across platforms and markets. Future studies could examine the identified relationships using customer-level data and complementary empirical approaches such as SEM or PLS-SEM, as well as replicate the framework across different digital retail settings. Extending the model to include factors such as digital service quality, user experience, perceived risk, perceived value, and electronic word-of-mouth may also provide a more comprehensive understanding of brand dynamics in online retailing.

Overall, the findings position Customer Satisfaction and Brand Loyalty as key driving elements within the examined system, while Brand Equity emerges as the most strongly influenced factor. Sustainable brand development in digital retailing therefore appears to depend on understanding how experiential, relational, and loyalty-related factors interact within the broader influence network rather than managing them as isolated outcomes.

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