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Omnichannel Customer Experience in Integrated Distribution Systems: A Higher-Order Perspective

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Abstract

Purpose: In increasingly integrated omnichannel environments, firms face growing challenges in coordinating distribution channels while delivering consistent experiences across multiple customer touchpoints. This study aims to conceptualize and empirically validate omnichannel customer experience (OCX) as a higher-order construct and to examine its effects on customer-driven outcomes within integrated distribution systems. **Research design, data and methodology:** The study employs a quantitative research design using survey data collected from 324 omnichannel consumers in Vietnam. A disjoint two-stage Partial Least Squares Structural Equation Modeling (PLS-SEM) approach is applied to validate the hierarchical reflective–formative measurement model of OCX and to assess its impact on key customer engagement behaviors relevant to distribution performance. **Results:** The results indicate that OCX has a significant positive influence on own purchases, incentivized referrals, social influence, and knowledge sharing, underscoring its role in shaping customer-driven outcomes that enhance distribution effectiveness. Channel consistency, personalization, product returns, and loyalty programs emerge as the most influential formative components of OCX. **Conclusions:** This study contributes to distribution science by validating OCX as a systemic construct and clarifying how integrated distribution design translates into customer-driven outcomes, with important managerial implications for omnichannel distribution strategy.

Keywords : Omnichannel Customer Experience; Integrated Distribution Systems; Omnichannel Distribution; Customer-Driven Outcomes

JEL Classification Code: M10, M31, M30

1. Introduction

The accelerating digital transformation of global commerce has fundamentally reshaped the structure, operation, and strategic orientation of modern distribution systems. As firms expand their presence across both physical and digital interfaces, the management of distribution channels has become increasingly complex, requiring higher levels of synchronization, real-time information flow, and multi-channel resource coordination.

In this context, omnichannel distribution has emerged as a dominant paradigm, enabling organizations to integrate formerly independent channels into a unified distribution architecture that enhances customer accessibility and

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strengthens channel competitiveness (Rigby, 2011; Brynjolfsson et al., 2013; Bell et al., 2014; Verhoef et al., 2015).

Contemporary research in distribution management consistently highlights that fragmented or poorly coordinated channels can lead to channel conflict, inconsistent messaging, delays in product or information flow, and diminished customer trust. Conversely, well-designed distribution integration mechanisms allow firms to streamline logistical processes, harmonize pricing and assortment strategies, reduce redundancy in distribution operations, and improve overall distribution efficiency (Neslin et al., 2006; Meyer & Schwager, 2007; Piotrowicz & Cuthbertson, 2014; Homburg et al., 2017). As customers increasingly navigate fluidly across channels within a single transaction, the capability to maintain consistent channel performance has become a central determinant of distribution effectiveness (Beck & Rygl, 2015; Lemon & Verhoef, 2016).

Within this evolving landscape, the construct of OCX has gained prominence as a multidimensional representation of how customers perceive a firm's distribution interface quality across various touchpoints. OCX reflects the cumulative impact of distribution-related elements such as the accuracy and reliability of information distributed across channels, consistency of offerings, responsiveness of distribution-linked services, the security of transactional exchanges, delivery and return processes, and the effectiveness of cross-channel communication systems. These dimensions together shape how customers evaluate the firm's distribution performance and the value derived from channel interactions (Rahman et al., 2022).

Simultaneously, the concept of customer engagement in distribution research has expanded beyond transactional metrics to encompass behaviors that meaningfully contribute to channel performance and long-term distribution success. Such behaviors including repeat purchasing, incentivized referrals, social influence, and knowledge sharing, represent forms of customer-driven distribution value creation, where customers themselves participate in enhancing the reach, credibility, and efficiency of the firm's distribution activities (Kumar et al., 2010; Kumar & Pansari, 2015). Understanding the behavioral pathways through which OCX influences these outcomes is therefore crucial for refining distribution strategies and optimizing channel investments.

Despite the growing body of work, a notable gap remains in comprehensively examining how the multidimensional structure of OCX, as a higher-order construct (HOC) interacts with customer engagement behaviors within integrated distribution ecosystems. Prior studies often examine individual distribution attributes in isolation, overlooking the systemic and interdependent nature of omnichannel distribution design (Herhausen et al., 2015; Juaneda-Ayensa et al., 2016; Payne et al., 2017; Chen et al., 2025, Shum & Beswick, 2025). Addressing this gap, the present study investigates the influence of OCX on four key engagement outcomes own purchases, incentivized referrals, social influence, and knowledge sharing, that collectively shape distribution performance and customer-driven channel amplification.

By adopting a reflective–formative modeling framework and grounding the analysis in distribution-oriented theoretical foundations, this research provides empirical insights for both scholars and practitioners. The findings contribute to the literature on distribution science by clarifying the role of OCX as a strategic lever for enhancing channel synergy, reinforcing distribution competitiveness, and improving customer-driven distribution outcomes in increasingly integrated and digitally mediated markets.

2. Literature Review

2.1. Omnichannel Customer Experience as a Higher-Order Construct

In contemporary distribution environments, firms operate multiple channels simultaneously, requiring a high level of integration to ensure consistency, coherence, and efficiency across all customer touchpoints. The shift toward omnichannel distribution has intensified the need for synchronized information flows, unified policies, and seamless interactions, all of which are essential for maintaining an effective and competitive distribution system (Hajdas et al., 2025). Prior research shows that strong channel integration minimizes channel conflict, reduces information gaps, and enhances customer trust, particularly when pricing, product information, fulfillment, and service integration operate coherently (Gao et al., 2021; Silva et al., 2024).

Within this context, OCX has emerged as a central construct that captures customers' holistic perception of a firm's distribution interface quality across integrated channels. OCX is conceptualized as a higher-order structure that reflects how customers evaluate the collective performance of distribution processes, spanning information accuracy, channel consistency, service responsiveness, personalization, data security, delivery reliability, return convenience, loyalty mechanisms, and cross-channel communication effectiveness (Chen et al., 2024). These dimensions directly relate to how distribution systems coordinate product flows, informational flows, and service flows to meet customer expectations.

Methodologically, OCX is appropriately modeled as a reflective–formative higher-order construct. At the lower

level, each OCX dimension is treated as a reflective construct measured by its respective indicators. At the higher level, these dimensions serve as formative components that jointly constitute customers' overall evaluation of omnichannel distribution effectiveness (Rahman et al., 2022). This modeling approach acknowledges that no single OCX dimension can substitute for another, and the absence or weakness of one dimension can fundamentally alter the holistic perception of the distribution system. Such a structure aligns well with the systemic nature of omnichannel distribution, where the quality of customer experience depends on the coherent orchestration of multiple interdependent distribution activities.

The formative nature of OCX therefore reflects the integrated logic of omnichannel distribution: consistency across channels, synchronized service processes, accurate and transparent information flows, and efficient logistics operations collectively shape customers' perceptions of distribution performance. When distribution touchpoints operate cohesively, OCX serves as a mechanism through which firms transform distribution system quality into customer-perceived value and, ultimately, into desirable behavioral responses (Chen et al., 2024; Rahman et al., 2025). As such, OCX provides a comprehensive theoretical foundation for understanding how integrated distribution design influences customer behavior in omnichannel environments.

2.2. Customer Engagement in Distribution Context

Customer engagement is recognized as an important construct in distribution research because it reflects the ways in which customers contribute to organizational value beyond their direct purchasing decisions. Contemporary studies emphasize that customers are active participants who influence the performance of distribution systems through a variety of behaviors, rather than passive recipients of distribution activities (Kumar & Pansari, 2015; Kumar et al., 2025). These behaviors strengthen the relationship between customers and the distribution network and support the long-term functioning of the distribution system, particularly as digital transformation increases opportunities for customer-initiated contributions such as feedback, social sharing, and advocacy (Asante et al., 2025).

In integrated omnichannel environments, customers interact with interconnected distribution touchpoints. Their actions influence information flows, the visibility of distribution channels, and customer perceptions of distribution reliability. Evidence shows that omnichannel customers engage across multiple channels, and their behaviors, such as repeat purchases, referrals, social influence, and knowledge sharing, play a critical role in shaping engagement outcomes and enhancing system performance (Van Nguyen, et al., 2024). Together, these outcomes illustrate how customers contribute to the effectiveness and resilience of distribution systems in omnichannel settings.

Own purchases represent repeated purchasing behavior that indicates the customer's ongoing reliance on the distribution system. This behavior directly supports channel revenue and reflects trust in the system's ability to deliver consistent distribution performance (Thompson & Wilson, 2024). Incentivized referrals encourage customers to share promotional messages with their networks, thereby amplifying channel reach (Jeong & Jo, 2024). These actions help expand the distribution network and reduce customer acquisition costs (Kumar et al., 2010). Social Influence describes customers sharing brand or distribution information with peers, which increases the visibility of distribution channels and shapes perceptions of distribution quality (Bhukya & Paul, 2023). Knowledge sharing refers to the feedback, suggestions, and information that customers provide to help organizations improve distribution processes, service quality, and system responsiveness (Cruz-Cárdenas et al., 2025).

These engagement behaviors show that customers contribute actively to distribution systems. Their actions help strengthen channel cohesion, expand the reach of the distribution network, and improve the flow of information. Understanding customer engagement in this context is important for explaining how OCX leads to meaningful behavioral outcomes that support the overall performance of omnichannel distribution systems.

2.3. OCX and Engagement Outcomes

The quality of OCX has been widely recognized as a central driver of customer behavioral responses in omnichannel distribution environments. Integrative reviews of omnichannel customer experience research show that when channel interactions are coherent and seamlessly coordinated, customers form stronger evaluations of the distribution system, which increases their willingness to participate in value-creating behaviors (Gerea et al., 2021; Thaichon et al., 2024). These reviews highlight that firms adopting consistent and unified omnichannel practices enhance convenience and reduce effort across the customer journey, thereby strengthening the foundation for ongoing engagement.

Empirical studies provide further evidence that channel integration directly improves customer evaluations of the omnichannel experience. Research demonstrates that integration in pricing, product content, transactional information, order fulfillment, and service processes positively influences both affective and cognitive reactions

to the experience, underscoring the importance of distribution alignment across touchpoints (Mishra et al., 2024; Chen & Chi, 2024). Additional findings reveal that the combined effect of channel consistency and channel seamlessness significantly enhances the customer experience, indicating that improvements in distribution coherence create more favorable perceptions of the omnichannel system as a whole (Gao & Jiang, 2024).

OCX also shapes downstream engagement behaviors that support distribution performance and system continuity. Studies examining channel integration quality show that improved integration increases customer responses such as repeated purchasing and advocacy, demonstrating that coordinated distribution systems encourage continued participation (Riaz et al., 2024). Parallel research on cross-channel integration shows that content and process consistency enhance customer trust, which subsequently fosters retention and strengthens the customer-distribution relationship (Moreno-Menéndez et al., 2025). These findings highlight that customers who perceive strong OCX are more likely to deepen their involvement with the distribution system.

OCX further influences behaviors related to post-purchase interactions, particularly those involving reverse distribution flows. Research on in-store return experiences demonstrates that supportive return policies and effective frontline service strengthen repurchase intentions and increase store traffic, indicating that the return component of the distribution system contributes meaningfully to customer engagement (Hao et al., 2024). Related work on return service quality shows that the design of return channels and the efficiency of reverse logistics influence customer loyalty, reinforcing the idea that OCX encompasses both forward and backward distribution processes (Xie et al., 2023; Peng et al., 2024). These findings demonstrate that OCX influences a wide range of customer behaviors that collectively enhance system responsiveness and distribution competitiveness.

Indeed, the literature provides strong justification for expecting OCX to influence four specific engagement outcomes central to distribution performance: own purchases, incentivized referrals, social influence, and knowledge sharing (Wiese, 2024; Liu & Liu, 2024; Sharma et al., 2024; Aryee & Adaku, 2024; Weippert, 2024). When customers perceive coordinated product flows, transparent information flows, and consistent service flows across channels, they are more willing to continue purchasing, recommend the firm, share information within their networks, and contribute feedback that supports distribution system improvement (Manser Payne et al., 2017; Li & Gong, 2022; Salem & Alanadoly, 2024). Therefore, this study proposes the following hypotheses:

H1. OCX positively influences own purchases.
H2. OCX positively influences incentivized referrals.
H3. OCX positively influences social influence.
H4. OCX positively influences knowledge sharing.

Grounded in the theoretical foundations of omnichannel distribution, the research model proposes that Omnichannel Customer Experience (OCX), represented as a higher-order construct composed of multiple reflective dimensions, influences several forms of customer engagement within integrated distribution systems. The model captures how customers' perceptions of channel integration, information quality, service responsiveness, and related experiential elements translate into behavioral outcomes that support distribution performance. Figure 1 presents the conceptual framework developed for this study.

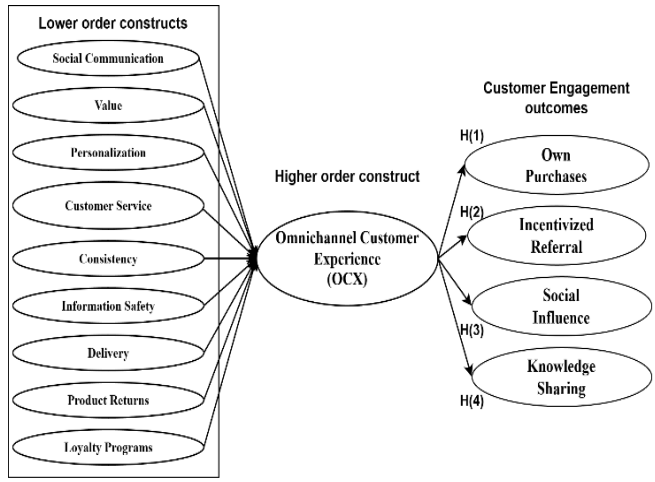

Figure 1: The Research Framework

3. Research Methodology

The research instrument was developed by adapting validated measurement scales from prior omnichannel and customer experience studies to ensure conceptual consistency and measurement reliability. OCX was assessed as a reflective–formative higher-order construct comprising nine lower-order reflective dimensions: social communications, value, personalization, customer service, channel consistency, information safety, delivery, product returns, and loyalty programs, measured using seven-point Likert items adapted primarily from Rahman et al. (2022). Customer engagement outcomes, including own purchases, incentivized referrals, social influence, and knowledge sharing, were measured using five-point Likert items based on the behavioral engagement framework of Kumar and Pansari (2016).

The study employed a quantitative research design using a structured questionnaire to examine the influence of OCX on customer engagement outcomes within an integrated channel environment. A non-probability convenience sampling approach was adopted, targeting consumers who had purchased from the same brand through at least two different channels within the past six months. This sampling strategy ensured that respondents possessed sufficient omnichannel experience to evaluate OCX and its behavioral outcomes meaningfully. The data collection process was conducted over a six-month period using both online and offline methods. Online surveys were distributed via social media platforms, while offline surveys were administered in locations with high frequencies of omnichannel consumers. After screening for completeness and response quality, a total of 324 valid responses were retained for analysis.

Additionally, data were analyzed using Partial Least Squares Structural Equation Modeling (PLS-SEM) following a disjoint two-stage approach. In the first stage, all lower-order reflective constructs were estimated and assessed independently by examining reliability, convergent validity, discriminant validity, and indicator collinearity. Latent variable scores for each lower-order construct were then exported. In the second stage, these scores were used as formative indicators to estimate the higher-order OCX construct. Formative validity was examined through outer weights, outer loadings, and multicollinearity checks. After validating the hierarchical measurement structure, the full structural model was evaluated using bootstrapping to obtain path coefficients, significance levels, and explanatory power for the four engagement outcomes.

4. Results

Table 1 summarizes the demographic characteristics of the 324 respondents included in the analysis. The sample features an almost equal gender distribution, with 51.9% male and 48.1% female participants. Most respondents fall within younger age groups, with 18–25 years accounting for 43.8% and 26–35 years for 37.3%. Occupations are diverse, with students representing the largest segment (31.5%), followed by business owners or self-employed individuals (21.9%), freelancers (17.9%), and government employees (16.7%). Monthly income levels vary, with the majority earning between 5 and 10 million VND per month (37.3%) or between 10 and 15 million VND (30.6%). In terms of purchasing activity, 63.5% reported making at least three purchases in the last year, indicating an active consumer base. A substantial proportion of respondents (79%) reported using multiple channels from the same brand, confirming the suitability of the sample for examining omnichannel experience and cross-channel behavior.

Table 1: Demographic Characteristics of the Respondents

Demographic	Frequency (n = 324)	Percentage
Gender		
Male	168	51.9%
Female	156	48.1%
Age		
18–25 years	142	43.8%
26–35 years	121	37.3%
36–45 years	61	18.8%
Occupation		
Student	102	31.5%
Government employee	54	16.7%
Freelancer	58	17.9%
Business owner	71	21.9%
Other	39	12%
Income		
5–10 million VND	63	19.4%
10–15 million VND	140	43.3%
Over 15 million VND	121	37.3%
Purchase frequency in multiple channels (past 12 months)		
1–2 times	39	12.1%
3–5 times	118	36.4%
6–10 times	97	29.9%
More than 10 times	70	21.6%

4.1. Stage 1: Assessment of the Measurement Model for Lower-Order Constructs (LOCs)

The measurement model for the lower-order constructs (LOCs) was assessed to ensure reliability and validity prior to conducting the structural model analysis. The evaluation procedure followed established guidelines by Hair et al. (2021) and Sarstedt et al. (2019) for Partial Least Squares Structural Equation Modeling (PLS-SEM).

Indicator reliability and multicollinearity were assessed to ensure the adequacy of the measurement model. Outer loading coefficients were examined following Hair et al. (2021), who recommend values of 0.7 or higher as evidence that indicators sufficiently explain their corresponding constructs. All lower-order constructs demonstrated acceptable loading values, and no indicators required removal. Multicollinearity was evaluated using the Variance Inflation Factor, with thresholds of 3.3 for ideal levels and 5 for acceptability. All indicators fell within acceptable ranges, confirming the absence of collinearity concerns and the conceptual distinctiveness of the constructs. Detailed loading and VIF results are provided in Appendix 1.

In addition, the reliability and convergent validity assessment results presented in Table 2 indicate that all constructs meet recommended measurement standards. Cronbach's alpha, rho_A, and composite reliability values for all constructs exceed the threshold of 0.70,

demonstrating strong internal consistency. Likewise, all AVE values are above 0.50, confirming adequate convergent validity. Several constructs, including Information Safety, Knowledge Sharing, Product Returns, and Delivery, show particularly high AVE scores, reflecting strong convergence between indicators and their respective lower-order constructs.

Table 2: Construct Reliability and Validity Assessment

Construct	α	rho_A	CR	AVE
CO	0.838	0.844	0.892	0.674
CS	0.865	0.870	0.908	0.713
DE	0.902	0.903	0.931	0.772
IR	0.930	0.931	0.950	0.827
IS	0.876	0.878	0.915	0.729
KS	0.903	0.904	0.933	0.776
LP	0.900	0.906	0.930	0.770
OP	0.830	0.834	0.887	0.662
PE	0.863	0.868	0.907	0.709
PR	0.858	0.858	0.913	0.779
SC	0.815	0.819	0.890	0.730
SI	0.819	0.822	0.880	0.648
VA	0.822	0.832	0.882	0.651

Note: α = Cronbach's alpha; rho_A = reliability coefficient; CR = composite reliability; AVE = average variance extracted. CO = Channel Consistency; CS = Customer Service; DE = Delivery; IR = Incentivized Referrals; IS = Information Safety; KS = Knowledge Sharing; LP = Loyalty Programs; OP = Own Purchases; PE = Personalization; PR = Product Returns; SC = Social Communications; SI = Social Influence; VA = Value.

Results in Table 3 indicate that all HTMT values fall below the recommended conservative threshold of 0.85, confirming that the constructs demonstrate adequate discriminant validity. According to Henseler et al. (2015), HTMT values below 0.85 provide strong evidence that constructs are empirically distinct, while values above 0.90 suggest potential conceptual overlap and threaten discriminant validity. None of the HTMT values in the present study approached these higher-risk levels, which indicates that the constructs are well differentiated and that each represents a unique dimension within the research model.

4.2. Stage-2: Measurement Model Assessment of Higher Order Construct HOCs

OCX was modeled as a reflective-formative higher-order construct, in which the lower-order dimensions served as formative indicators contributing to the overall OCX construct. In the first stage of the analysis, latent variable scores for each lower-order construct were calculated and exported. These scores were then used as formative indicators in the second stage to estimate the higher-order OCX construct, following the guidelines of Hair et al. (2021) and Sarstedt et al. (2019). The significance and relevance of each indicator were assessed using outer weights with 5,000-sample bootstrapping ($p < 0.05$), ensuring that each lower-order dimension made a meaningful contribution to the formation of OCX.

The results in table 4 indicated that, the outer weight test revealed that channel consistency (outer weight = 0.353, p = 0.000), personalization (outer weight = 0.296, p = 0.000), product returns (outer weight = 0.292, p = 0.001), and loyalty programs (outer weight = 0.214, p = 0.015) were statistically significant at $p < 0.05$, indicating their substantial contribution to forming OCX. Conversely, customer service (outer weight = -0.053, p = 0.331), delivery (outer weight = -0.146, p = 0.059), information safety (outer weight = 0.094, p = 0.129), social communications (outer weight = 0.064, p = 0.223), and value (outer weight = 0.046, p = 0.341) exhibited non-significant outer weights.

Table 3: The Assessment of Discriminant Validity by HTMT Criterion

	CO	CS	DE	IR	IS	KS	LP	OP	PE	PR	SC	SI	VA
CO													
CS	0.805												
DE	0.737	0.833											
IR	0.407	0.288	0.188										
IS	0.757	0.803	0.771	0.277									
KS	0.619	0.415	0.282	0.601	0.422								
LP	0.812	0.711	0.628	0.444	0.697	0.563							
OP	0.758	0.767	0.801	0.294	0.765	0.483	0.628						
PE	0.782	0.828	0.646	0.422	0.736	0.557	0.738	0.684					
PR	0.805	0.790	0.834	0.366	0.816	0.433	0.685	0.763	0.662				
SC	0.715	0.777	0.725	0.301	0.687	0.412	0.642	0.738	0.802	0.675			
SI	0.704	0.577	0.475	0.602	0.608	0.838	0.616	0.716	0.665	0.656	0.530		
VA	0.845	0.819	0.808	0.296	0.755	0.437	0.649	0.783	0.849	0.739	0.870	0.579	

Further analysis of outer loadings showed that all indicators exceeded the threshold of 0.5, with communications (0.899), personalization (0.850), loyalty programs (0.835), product returns (0.816), information safety (0.780), value (0.768), customer service (0.765), social communications (0.715), and delivery (0.675) all retaining relevance. According to the validation procedure, indicators with non-significant outer weights but outer loadings > 0.5 should be retained for further consideration rather than deleted.

Table 4: Validation of Formative Measurement Model for Higher-order Constructs

HOC	LOCs	Outer weight	T-statistics	*p*-value	Outer loading
OCX	CO	0.353	3.764	0.000	0.899
	CS	-0.053	0.437	0.331	0.765
	DE	-0.146	1.565	0.059	0.675
	IS	0.094	1.131	0.129	0.78
	LP	0.214	2.168	0.015	0.835
	PE	0.296	3.528	0.000	0.85
	PR	0.292	3.223	0.001	0.816
	SC	0.064	0.764	0.223	0.715
	VA	0.046	0.41	0.341	0.768

Note: CO = Channel Consistency; CS = Customer Service; DE = Delivery; IR = Incentivized Referrals; IS = Information Safety; KS = Knowledge Sharing; LP = Loyalty Programs; OP = Own Purchases; PE = Personalization; PR = Product Returns; SC = Social Communications; SI = Social Influence; VA = Value.

Thus, despite their non-significant weights, customer service, delivery, information safety, social communications, and value were kept in the model due to their adequate outer loadings. These findings suggest that while channel consistency, personalization, product returns, and loyalty programs are the primary drivers of OCX, the remaining LOCs still contribute to its formative structure, supporting the robustness of the reflective-formative HOC model of OCX.

4.3. Structural Model Assessment

The structural model demonstrated good explanatory power. The R^2 values indicated substantial explanatory power, with OCX explaining 48% of the variance in own purchases ($R^2 = 0.480$) and 19.3% in incentivized referrals ($R^2 = 0.193$), while OCX explained 43.7% of the variance in social influence ($R^2 = 0.437$) and 33.4% of the variance in knowledge sharing ($R^2 = 0.334$).

Table 5, the structural model results show that OCX has a significant positive impact on all four engagement outcomes. The effect on own purchases is strong, with a path coefficient of $\beta = 0.693$, $t = 17.682$, $p = 0.000$, supporting H1. OCX also positively influences incentivized referral, with $\beta = 0.440$, $t = 8.096$, $p = 0.000$, confirming H2. Similarly, a substantial positive effect is observed for social influence, with $\beta = 0.661$, $t = 19.878$, $p = 0.000$, supporting H3. Finally, OCX significantly enhances knowledge sharing, with $\beta = 0.578$, $t = 14.243$, $p = 0.000$, supporting H4. Since all p-values are below 0.05, all hypothesized relationships are statistically significant, indicating that stronger OCX perceptions consistently lead to higher levels of customer engagement across all four behavioral dimensions.

Table 5: Summary of Hypotheses Testing Results

Hypotheses	β	t-Value	*p*-Value	*Result*
H1: OCX → OP	0.693	17.682	0.000	Supported
H2: OCX → IR	0.44	8.096	0.000	Supported
H3: OCX → SI	0.661	19.878	0.000	Supported
H4: OCX → KS	0.578	14.243	0.000	Supported

5. Discussion and Implications

The findings of this study provide robust empirical evidence supporting the role of OCX as a pivotal driver of customer engagement behaviors within integrated distribution systems. By modeling OCX as a reflective-formative higher-order construct, the results affirm that its multidimensional structure, encompassing elements such as channel consistency, personalization, product returns, loyalty programs, customer service, delivery, information safety, social communications, and value, significantly influences key engagement outcomes: own purchases, incentivized referrals, social influence, and knowledge sharing. These outcomes collectively enhance distribution performance by fostering customer-driven value creation, amplifying channel reach, and improving system efficiency.

This research contributes to distribution science by clarifying how OCX, conceptualized as a holistic perception of distribution interface quality, translates into behavioral responses that reinforce channel synergy and strengthen competitiveness. Grounded in omnichannel distribution theory, prior reviews emphasize that customers evaluate distribution effectiveness based on the coherence of interactions across online and offline touchpoints, which collectively shape satisfaction and behavioral intentions (Gerea et al., 2021). The findings extend this body of work by demonstrating that OCX is not simply an aggregation of discrete channel attributes but a formative higher-order construct in which interdependent dimensions jointly determine perceived distribution quality. This view aligns with Rahman et al. (2022), who identify nine integrated evaluative dimensions, including channel consistency, personalization, product returns, and loyalty programs, as

central to the OCX construct. The significance of these formative weights in the present study indicates that these dimensions play a central role in reducing channel conflict and ensuring smooth product, information, and service flows, which are core concerns in distribution management.

The positive effects of OCX on customer engagement outcomes further enrich the theoretical understanding of how experience-driven perceptions influence value creation within distribution systems. The strong association with own purchases supports the argument that coherent omnichannel experiences enhance repeat buying behavior, which stabilizes revenue flows and improves operational efficiency within distribution networks (Gao & Fan, 2021). Similarly, the effects on incentivized referrals and social influence highlight how OCX encourages customers to amplify channel reach through advocacy and informal communication, reducing dependence on traditional intermediaries. These mechanisms align with omnichannel research showing that consistent and satisfying cross-channel experiences generate word-of-mouth effects and encourage customers to promote the brand voluntarily (Jung et al., 2021). Moreover, the influence of OCX on knowledge sharing introduces an important dimension to distribution research by illustrating how customers contribute feedback that enhances system responsiveness, including areas such as reverse logistics and service recovery. This perspective corresponds with contemporary views of customers as active participants in co-creating value within distribution systems (Rahman et al., 2022).

By employing a disjoint two-stage PLS-SEM approach, the study also addresses methodological limitations in prior research, which has often examined OCX dimensions individually rather than as an integrated system. Earlier works have emphasized the need to understand how channel integration and consistency jointly shape behavioral outcomes in dynamic omnichannel contexts (Herhausen et al., 2015; Juaneda-Ayensa et al., 2016). The reflective–formative validation presented here provides empirical support for modeling OCX as a systemic construct, offering a foundation for future investigations into how distribution integration moderates or mediates downstream engagement behaviors in increasingly digitalized markets.

From a managerial perspective, the findings offer actionable insights for distribution practitioners aiming to enhance channel performance in omnichannel environments. Firms should prioritize investments in the core drivers of OCX: channel consistency, personalization, product returns, and loyalty programs, to foster engagement behaviors that directly support distribution objectives. For example, ensuring channel consistency through synchronized pricing and assortment strategies can reduce information discrepancies, thereby boosting own purchases and minimizing stockouts or overstocking issues in logistics operations. Personalization, via data-driven recommendations across touchpoints, can enhance customer trust and incentivize referrals, expanding distribution reach without escalating acquisition costs.

Moreover, the emphasis on product returns underscores the importance of efficient reverse distribution flows, such as streamlined return policies and logistics integration, which not only improve OCX but also encourage knowledge sharing for continuous process refinement (Hao et al., 2024; Xie et al., 2023). Loyalty programs, as a significant formative indicator, suggest that reward mechanisms tied to cross-channel interactions can amplify social influence, turning customers into informal distribution advocates. Distribution managers in retail and e-commerce sectors, particularly in emerging markets like Vietnam, where the sample was drawn, should leverage these insights to design integrated systems that prioritize real-time synchronization and customer-centric logistics, ultimately leading to improved efficiency, reduced operational redundancies, and heightened competitiveness.

In practice, firms can implement OCX diagnostics using the validated scales from this study to benchmark distribution performance and identify weak links in channel integration. This is particularly relevant for global distribution networks facing digital disruptions, where enhancing OCX can mitigate risks associated with channel fragmentation and support sustainable growth.

6. Conclusions

This study empirically demonstrates that OCX, modeled as a reflective-formative higher-order construct, significantly and positively influences key customer engagement behaviors: own purchases, incentivized referrals, social influence, and knowledge sharing, within integrated distribution systems. These findings affirm OCX as a strategic driver for enhancing channel synergy, reducing distribution conflicts, and fostering customer-driven value creation, thereby advancing distribution science in digitally mediated markets. Theoretically, the research enriches omnichannel distribution theory by validating OCX's multidimensional role in behavioral outcomes, while practically, it guides managers in prioritizing channel consistency, personalization, returns, and loyalty programs to optimize logistics efficiency and competitiveness.

Despite its contributions, the study is limited by its convenience sampling of Vietnamese consumers, potentially restricting generalizability, and its cross-sectional design, which overlooks temporal dynamics in OCX and engagement.

Future research should employ longitudinal methods to track OCX evolution in distribution networks, conduct

cross-cultural or industry-specific comparisons (e.g., retail vs. services), and integrate objective metrics like logistics performance indicators. Exploring mediators (e.g., distribution trust) or moderators (e.g., technology adoption) could further refine the model.

Declarations

Ethics Approval and Consent to Participate

This study did not involve human participants or animal subjects.

Competing Interests / Conflicts of Interest

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Appendixes

Appendix 1: Indicator Reliability

	CO	CS	DE	IR	IS	KS	LP	OP	PE	PR	SC	SI	VA	VIF
CO1	0.759													1.568
CO2	0.847													2.031
CO3	0.824													1.869
CO4	0.851													2.049
CS1		0.809												2.144
CS2		0.868												2.408
CS3		0.888												2.634
CS4		0.809												1.941
DE1			0.865											2.412
DE2			0.888											2.725
DE3			0.891											2.860
DE4			0.869											2.348
IR1				0.896										2.968
IR2				0.915										3.610
IR3				0.936										4.525
IR4				0.890										2.960
IS1					0.844									2.388
IS2					0.878									2.800
IS3					0.864									2.196
IS4					0.829									1.954
KS1						0.848								2.183
KS2						0.900								3.026
KS3						0.894								2.977
KS4						0.880								2.607
LP1							0.842							2.291
LP2							0.898							2.967
LP3							0.891							2.913
LP4							0.877							2.469
OP1								0.845						1.933
OP2								0.790						1.736
OP3								0.814						1.786
OP4								0.805						1.679
PE1									0.792					1.767
PE2									0.858					2.118
PE3									0.860					2.248
PE4									0.857					2.175
PR1										0.876				2.077
PR2										0.890				2.333
PR3										0.881				2.101
SC1											0.860			1.895
SC2											0.821			1.631
SC3											0.881			1.988
SI1												0.817		1.822
SI2												0.827		1.914
SI3												0.822		1.835
SI4												0.753		1.593
VA1													0.803	1.771
VA2													0.763	1.591
VA3													0.840	1.786
VA4													0.818	1.808