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Optimizing Omnichannel Information Systems for Customer Stickiness: Management Implications from an Extended Technology Acceptance Mode Analysis

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Abstract. Customer stickiness in omnichannel information systems represents a critical strategic asset for management in today's competitive digital marketplace. This study extends the Technology Acceptance Model (TAM) to investigate how information systems design and management strategies influence customer retention and engagement across integrated digital channels. Analyzing data from 366 participants, we examine the relationships between system characteristics (perceived usefulness, perceived ease of use), social interactivity features, user attitudes, and customer stickiness in omnichannel environments. The findings reveal that effective information systems management significantly impacts customer stickiness, with perceived usefulness demonstrating the strongest direct effect. Our structural equation modeling confirms that 61.2% of customer stickiness variation can be attributed to system design factors and user attitudes. The research provides management professionals with an empirically validated framework for strategically developing and implementing omnichannel information systems that enhance customer retention. By integrating social interactivity elements with traditional TAM components, this study offers information systems managers concrete strategies for improving system design, channel integration, and user interface management to optimize customer engagement and competitive advantage in omnichannel retail ecosystems. These insights contribute to both information systems theory and practical management approaches for digital retail transformation.

Keywords: Technology Acceptance Model, information systems management, omnichannel integration, customer stickiness, digital retail management

1. Introduction

As more and more devices get connected to the web, more and more people use the web as a social medium. The e-commerce industry in Vietnam has expanded rapidly in recent years. Businesses have come to see the Internet as a viable sales medium. Consumers may now easily and cheaply access vast amounts of information and shop around for goods and services thanks to the Internet (Duy Phuong et al., 2025). The resulting reduced switching and search costs are unparalleled. E-commerce businesses now have the issue of attracting visitors to their sites and keeping them there. Websites that are "sticky" are able to attract and keep visitors. The cost to retain an existing user is often far lower than the cost to acquire a new one, therefore increasing user stickiness may have a major impact on marketing budgets (Bao & Zhu, 2023). As a user spends more time online, Yu et al. (2025) found that the likelihood of making an online purchase increases. Xiaozhou (2019) discovered that when website visitors return and spend more time there, they get more invested in the site and ultimately make more purchases.

Creating a user-friendly and engaging e-commerce website is a significant problem for online companies (Al-Okaily et al., 2021). Search engines, pricing comparison tools, and the ease with which users may hop from one website to another have all contributed to a fiercely competitive online market (Jin & Lim, 2021). This creates a challenging environment for online retailers to keep customers engaged on their sites. Stickiness of websites is a major factor in the success of online stores in these contexts. In a nutshell, website stickiness is the rate at which repeat visitors return to a certain website (Yohanes Farley & Sfenrianto, 2021). Customers are more likely to make purchases and develop brand loyalty when they spend longer time on sticky websites (Khoa, 2024). Therefore, it is crucial for online firms to learn how to make their websites more engaging and compelling. Adding features like a product search engine or product photos to an e-commerce website, according to a number of studies in the field of e-commerce and marketing, may increase website stickiness (He et al., 2020). Following the lead of the omnichannel system, several businesses have started enhancing their e-commerce offerings with social commerce capabilities (Khoa & Huynh, 2023b).

The concept of omnichannel retail represents a significant evolution from the traditional multi-channel approach. While multi-channel retailing involves operating separate channels independently, omnichannel strategies integrate these channels to provide a seamless customer experience (Verhoef et al., 2021). This integration is becoming increasingly critical as consumer behaviors evolve in the digital era. Modern consumers frequently switch between online and offline channels during their shopping journey, researching products online before purchasing in-store or vice versa. This behavior, often referred to as "webrooming" and "showrooming," necessitates a cohesive experience across all touchpoints.

The Technology Acceptance Model (TAM), originally developed by Davis (1989), offers a theoretical foundation for understanding how users come to accept and use technology. Within the context of omnichannel systems, TAM provides valuable insights into the factors influencing customer adoption and continued usage. As Pantano et al. (2022) argue, the perceived usefulness and perceived ease of use of digital retail technologies significantly impact consumer attitudes and behavioral intentions. These factors become even more critical in omnichannel environments where customers interact with multiple integrated technologies.

Social interactivity has emerged as another crucial dimension in digital commerce environments. According to Huang and Benyoucef (2017), social interactions in online shopping contexts can enhance user engagement and foster a sense of community. This social aspect is particularly relevant to omnichannel systems, where customers may share experiences across platforms and influence others' perceptions and behaviors. The integration of social elements into omnichannel strategies can potentially enhance customer stickiness by creating more immersive and engaging experiences.

Despite the growing body of literature on technology acceptance, social interactivity, and customer stickiness, there remains a significant gap in understanding how these concepts interact within

omnichannel systems. While previous studies have examined these factors in traditional e-commerce contexts, the unique characteristics of omnichannel environments—particularly the integration of multiple channels and the seamless movement of customers between channels—necessitate specialized investigation. Furthermore, while the Technology Acceptance Model has been widely applied in e-commerce research, its extension to incorporate social interactivity in omnichannel contexts represents a novel contribution to the literature. By examining how perceived usefulness, perceived ease of use, and social interactivity collectively influence customer attitudes and stickiness in omnichannel systems, this study addresses an important gap in current understanding and provides valuable insights for both researchers and practitioners in the field of digital commerce.

. While previous research has examined various aspects of omnichannel retailing and customer engagement (Khoa & Thanh, 2025), few studies have comprehensively analyzed the relationship between perceived usefulness, perceived ease of use, social interactivity, and customer stickiness within integrated omnichannel systems.

Our study adds new insights to the literature on the topic of website stickiness and omnichannel platforms. This research helped shed light on the question of whether or not the implementation of more robust sets of omnichannel system features increases website stickiness, a key aspect in the success of e-commerce websites. Furthermore, this study aims to provide practical recommendations for businesses seeking to enhance customer stickiness through strategic implementations of omnichannel technologies that align with user perceptions and preferences.

2. Literature review

2.1. Customer stickiness

Customer stickiness, referring to users' tendency to return to and spend time on a particular website or platform, has been identified as a crucial metric for online business success (Xiaozhou, 2019). Bao and Zhu (2023) described stickiness as a multidimensional construct encompassing visit frequency, duration of engagement, depth of interaction, and brand recognition. These dimensions collectively reflect users' attachment to and ongoing relationship with a digital platform.

In the e-commerce context, customer stickiness has been linked to several positive outcomes, including increased purchase likelihood, higher customer lifetime value, and enhanced brand loyalty. Research by He et al. (2020) demonstrates that sticky websites generate more revenue through both direct sales and advertising, highlighting the financial implications of enhancing user retention and engagement.

Many people simplify user stickiness into a single dimension. As a result, the variations in measurements are reduced to those due to variances in the quantity and kind of indicators. There are two primary types of measures of user stickiness: indicators of user behavior and indicators of user outcomes. Pageviews, clickthrough rates, visit duration, and visit frequency are just few of the metrics that make up the behavior indicators (Xiaozhou, 2019). Indicators like as future purchases and interest are included in the outcomes. The latter metrics are often used to conventional online retail. In this research, we examine indications of consumer behavior to separate social commerce from more conventional forms of online shopping. According to Bao and Zhu (2023), some metrics for measuring user stickiness are:

i) the number of times a user visits a website;

ii) the amount of time spent reading content;

iii) the degree to which the user interacts with the website or other users; and

iv) the degree to which the user recognizes a brand. For this reason, signs of user stickiness are gleaned from these analyses.

2.2. Hypothesis development

The Technology Acceptance Model (TAM), introduced by Davis (1989), provides a theoretical framework for understanding how users come to accept and use technology. The model identifies two primary factors influencing technology adoption: perceived usefulness (the extent to which a user believes that using a particular system would enhance their performance) and perceived ease of use (the degree to which a user believes that using a system would be free of effort). The application of TAM to omnichannel contexts, however, presents unique considerations. As noted by Khoa (2025), the integration of multiple channels introduces additional complexities to user perceptions and behaviors. For instance, the perceived usefulness of an omnichannel system may depend not only on the functionality of individual channels but also on the seamlessness of transitions between channels and the consistency of information across touchpoints.

Perceived usefulness, or users' expectations and assumptions about the system's utility, is one of the factors considered in the technological adoption model. In a nutshell, it's the extent to which a person anticipates little effort required to make use of a certain piece of technology (free of effort). Davis (1989) drew connections between the perceived usefulness of technical systems and the desire to use them. The fundamental variable of TAM is the user's perception of how simple and straightforward a new technology is to use. Simply put, it's the extent to which people believe they can do a certain activity or job with such technology. Users of smartphones or omnichannel shoppers, for example, make decisions about their continued engagement with these technologies based on their evaluation of the value they derive from ancillary services and systems (Khoa & Khanh, 2021). As a result, we consider perceived usefulness and perceived ease of use to be very effective and essential factors in shaping the future adoption of new technologies. The following hypotheses were tested within the framework of this premise:

H1: Customer’s attitude towards omnichannel systems positively impacts customer stickiness.

H2: Perceived usefulness positively impacts the customer’s attitude toward omnichannel systems.

H3: Perceived ease of use positively impacts the customer’s attitude toward omnichannel systems.

H4: Perceived usefulness positively impacts customer stickiness.

Social interactivity has emerged as a critical dimension of online shopping experiences, encompassing user-to-user interactions, customer reviews, social media integration, and community-building features (Ting et al., 2021). The concept extends beyond traditional e-commerce functionality to incorporate elements of social commerce, where social interactions influence purchasing decisions and enhance user engagement.

Hall (2018) defines social interactivity in digital environments as the degree to which users can communicate with one another, share experiences, and influence others' perceptions and behaviors. Research indicates that social interactivity can significantly impact user engagement, satisfaction, and loyalty in online contexts. For instance, He et al. (2020) found that social commerce features such as user reviews, ratings, and discussion forums can enhance website stickiness by encouraging return visits and prolonging browsing duration. In omnichannel contexts, social interactivity takes on additional dimensions, as interactions may occur across multiple channels and influence behavior across the entire customer journey. Users save time and effort by exchanging information in real-time, improving their purchases’ practicality (Hall, 2018). In addition, users might have a sense of belonging and less difficulty communicating by discovering their virtual communities via channel engagement. These investigations allow us to offer the following hypotheses:

H5: Social interactivity positively impacts the customer’s attitude toward omnichannel systems.

From the hypotheses above, this study proposed the research model as Figure 1.

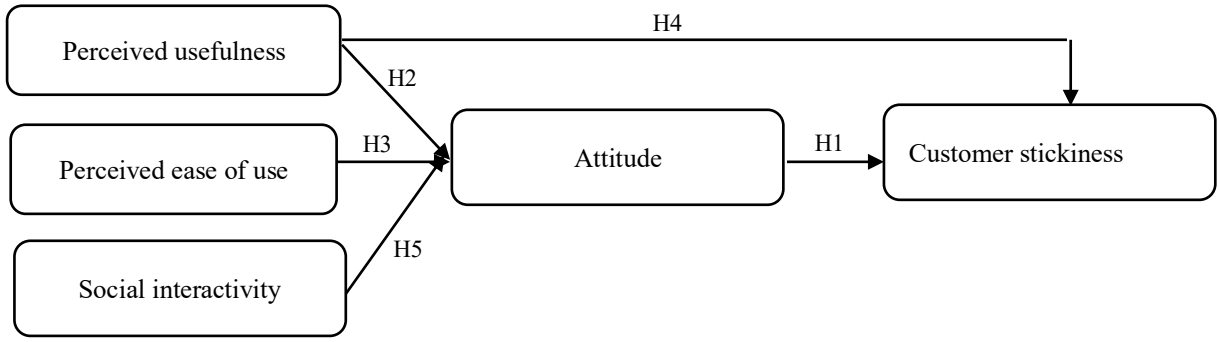

Fig.1: Research model

3. Methodology

This study designed a web-based questionnaire especially for those who shop at omnichannel stores. A Vietnamese online survey sample was used for this study. Omnichannel consumers were defined as those who made purchases from the same merchant through at least two different channels over the course of our research. Participants were vetted to ensure they were true omnichannel consumers. A total of 366 individuals provided information on their most recent purchase during the previous year before the data was collected (January 2025).

The firms also employ an omnichannel approach, which means that throughout the customer lifecycle, they may interact with the brand in a variety of ways, both online and offline. Customers may use the mobile app to research a product, make a purchase on the website, and then either pick up their purchase from the store or make a return. To isolate the omnichannel factor, that is, to identify the drivers for utilizing multiple channels and/or technologies of a single firm throughout a single buying transaction, we focused on a single company to analyze the variables impacting omnichannel consumers' behavior.

There were two sections to the survey. The first section included some claims concerning the reasons people go shopping. Respondents were asked to score their level of agreement with each statement considering their most recent shopping experience, using a five-point Likert scale ranging from 1 (completely disagree) to 5 (completely agree). Measurement scale for perceived usefulness (USE, 3 items), perceived ease of use (EASE, 3 items), attitude towards toward omnichannel systems (ATT, 4 items) were adopted from Davis (1989). Social interaction (SIN) was measured by 3 items from McMillan and Hwang (2002); and there were 3 items to measure customer stickiness (STI) (Wu & Tsang, 2008). The demographic of respondents was presented in Table 1.

The demographic profile presented in Table 1 provides a robust foundation for investigating omnichannel information systems usage, featuring a relatively balanced gender distribution (56.8% male, 43.2% female) and remarkably even age representation across life stages (25.7% aged 18-25, 27.9% aged 26-35, 23.8% aged 36-45, and 22.7% aged >45). This demographic diversity, further enriched by varied occupational contexts including housewives (23.8%), businessmen (21.0%), students (19.7%), lecturers (19.4%), and office workers (16.1%), strengthens the ecological validity of the findings for information systems managers developing cross-channel technologies. The balanced distribution across gender, age, and professional contexts enables information systems researchers to examine how system characteristics influence customer stickiness across diverse user segments, providing valuable insights for designing interfaces that accommodate varying levels of technical proficiency, implementing market segmentation strategies in digital environments, and creating information systems that effectively serve users throughout their customer lifecycle—critical considerations for management professionals seeking to optimize omnichannel engagement and retention.

Table 1. Demographic of respondents

		Frequency	Percent
Gender	Male	208	56.8
	Female	158	43.2
Age group	18-25	94	25.7
	26-35	102	27.9
	36-45	87	23.8
	>45	83	22.7
Occupation	Student	72	19.7
	Office worker	59	16.1
	Housewife	87	23.8
	Lecturer	71	19.4
	Businessman	77	21.0

4. Results

The measurements and hypotheses were analyzed using a structural equation model based on partial least squares (PLS-SEM). PLS-SEM is more flexible than the covariance-based structural equation model in terms of sample size and data normality. This strategy is useful for analyzing complicated models with little data. This study double-checked the measurement model and the structural model as recommended by Anderson and Gerbing (1988).

All model constructs, including their reliability and validity, were given primary attention. The test results are shown in Table 2. Each construct has a Cronbach's Alpha over 0.746, which is above the minimum criteria of 0.70. In addition, the Composite reliability (CR) values fall from 0.851 to 0.955, much over the desired threshold of 0.70. These findings demonstrate the validity and reliability of the instruments used (Fornell & Larcker, 2018). Second, we made sure that all of our conceptions were both convergent and discriminant valid. All indicator outer loadings in Table 3 are more than 0.779, much over the cutoff threshold of 0.708 proposed by Hair Jr et al. (2016). Table 2 also shows that all the constructs' average variance extracted (AVE) values are more than the minimum value of 0.50, and that all of the CR values are also greater than the threshold value of 0.70. Convergent validity of measures is adequate if compared to the criteria proposed by Fornell and Larcker (2018).

Table 2. Cronbach’s Alpha, CR, AVE value

	CA	rho_A	CR	AVE
ATT	0.914	0.914	0.939	0.795
EASE	0.834	0.838	0.900	0.751
SIN	0.929	0.941	0.955	0.876
STI	0.746	0.777	0.851	0.656
USE	0.859	0.863	0.914	0.781

Table 3. Outer loading value

	ATT	EASE	SIN	STI	USE
ATT1	0.901				
ATT2	0.874				

ATT3	0.924				
ATT4	0.867				
EASE1		0.833			
EASE2		0.881			
EASE3		0.885			
SIN1			0.948		
SIN2			0.911		
SIN3			0.947		
STI1				0.84	
STI2				0.779	
STI3				0.81	
USE1					0.853
USE2					0.876
USE4					0.921

Comparing the square root of the AVE across all constructs to the correlations between them allowed us to test for discriminant validity. AVE square roots for the various constructions are shown in Table 4's italicized diagonal numbers. These numbers plainly outweigh any potential relationships between the target construct and any other variables. These findings suggest adequate discriminant validity, meaning the measurement model's constructs are distinct from one another (Fornell & Larcker, 2018). Cross-loadings of measurements were also analyzed to further evaluate discriminant validity. Each measurement item has a higher loading on its designated latent variable than it does on any other construct, as shown in Table 4. It reaffirms that all measures have sufficient discriminant validity.

Table 4. Fornell and Larcker Criterion

Construct	**ATT**	**EASE**	**SIN**	**STI**	**USE**
ATT	0.892				
EASE	0.497	0.866			
SIN	0.461	0.355	0.936		
STI	0.616	0.548	0.587	0.81	
USE	0.46	0.366	0.315	0.711	0.884

There was no collinearity in the research model as all Variance Inflation Factor (VIF) value in Table 5 were less than 3. Moreover, perceived usefulness has the large effect size on the customer stickiness ($f^2_{USE->STI} = 0.597$). All Q2 values were greater than zero, hence, the model has good predictivity.

Table 5. VIF, f^2, Q^2

Construct	VIF		f^2		Q^2
	ATT	***STI***	***ATT***	***STI***	
ATT		1.268		0.273	0.311
EASE	1.247		0.124		
SIN	1.199		0.101		
STI					0.375
USE	1.209	1.268	0.095	0.597	

The explanatory power of the model's constructs (R^2) and the statistical significance of the model's path coefficients were analyzed. In particular, 5000 separate bootstrapping runs were used to assess the relevance of each individual route as Figure 2. R^2_{STI} = 0.612, where pointed 61.2% of customer stickiness variation due to the impact of perceived usefulness and attitude towards the omnichannel systems. Specifically, H1 is supported by the findings that attitude towards the omnichannel systems has a positive impact on customer stickiness (beta = 0.367, t-value = 9.07). Perceived usefulness is positively associated with attitude towards the omnichannel systems (beta = 0.263, t-value = 4.137) and customer stickiness (beta = 0.542, t-value = 15.361). As a result, both H2 and H4 were accepted. Concurrently, H3 was supported by the fact that perceived ease of use has a positive correlation with attitude towards the omnichannel systems (beta = 0.305, t-value = 4.577). Positive relationship between social interactivity and attitude towards the omnichannel systems (beta= 0.27, t-value = 4.511) provided support for hypothesis H5.

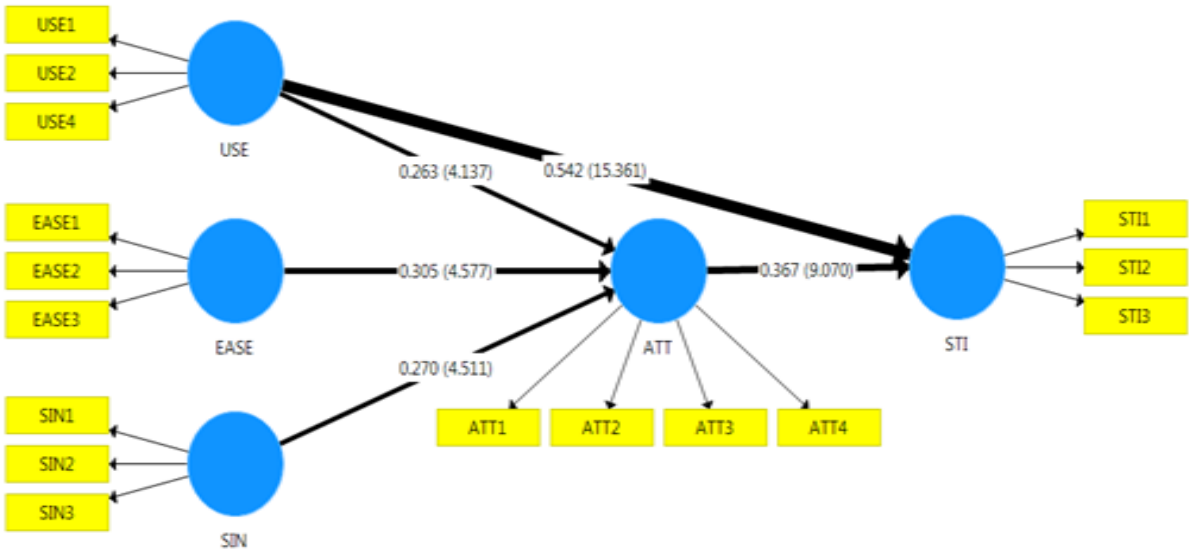

Fig.2: PLS-SEM result

5. Conclusion

5.1. Discussion

The retail business is becoming more competitive, leading to the emergence of a new phenomenon: omnichannel commerce. Businesses must connect all points of contact to deliver a unified, seamless buying experience across all platforms (the physical store, the online channel, the mobile channel, and social media). One definition of this phenomena is the approach to customer management used across

the board in businesses. One possible form of e-commerce for the third generation is "omnichannel retailing."

The findings confirmed the TAM in explaining the role of omnichannel systems in generating customer stickiness. Webroomers, as opposed to showroomers, are those who take a more deliberate, well-thought-out approach to their purchase decisions by doing extensive online research before visiting a physical store. These omni-shoppers frequently already have a firm concept of what they want to buy before they enter a physical store, and they use the product's qualities as a major criterion in making a purchase choice (Khoa & Huynh, 2023a). For these and other reasons, it's helpful for webroomers to have access to reviews online . Once inside the shop, it may be tough to sway their opinion, since they will likely know more about the product's technical details than the salesman servicing them. Despite the convenience of online shopping, omni-shoppers still prefer in-store interactions with friendly salespeople. Especially for "touch and feel" items like clothing, where sensory stimulation plays a significant role, this is crucial (Quach et al., 2022). Explanations of webrooming have noted the significance of aspects relating to sales advice or the urge to touch. Moreover, social interaction plays a vital role in shaping users' attitudes towards omnichannel systems. Interactions with other users, customer reviews, and social media discussions create a dynamic environment where individuals share their experiences and opinions. These social interactions can significantly influence users' attitudes, as positive or negative interactions contribute to the formation of perceptions about the system (Hall, 2018). Therefore, understanding how social interaction affects attitudes is crucial in predicting and enhancing customer stickiness. Positive social interactions within an omnichannel system can contribute to the development of favorable attitudes among users. When users receive helpful recommendations, engage in discussions, or benefit from community support, their overall perception of the system becomes more positive. This positive attitude can act as a driver for customer stickiness as users are more likely to remain engaged and loyal to the system. Conversely, negative social interactions may result in unfavorable attitudes and lower stickiness.

5.2. Theoretical contributions

This study makes several significant contributions to the information systems and management literature. First, we extend the Technology Acceptance Model (TAM) by incorporating social interactivity as a critical dimension in omnichannel contexts. While previous research has applied TAM to various technology adoption scenarios, our integration of social interactivity with traditional TAM constructs advances theoretical understanding of how interactive information systems influence user attitudes and behaviors in integrated digital environments. This extended model provides a more comprehensive framework for analyzing user engagement with complex, multi-touchpoint information systems. Second, our empirical validation of the relationships between system characteristics (perceived usefulness, perceived ease of use), social interactivity, attitudes, and customer stickiness enhances the theoretical foundation for omnichannel information systems design. The finding that perceived usefulness directly influences customer stickiness with a substantial effect size extends TAM by demonstrating that system utility impacts not only attitudes but also behavioral outcomes in omnichannel contexts. This challenges the traditional TAM assumption that attitudes fully mediate the relationship between perceived usefulness and behavioral intentions.

Third, our research contributes to information systems theory by quantifying the explanatory power of system design factors in predicting customer stickiness. This finding establishes that information system characteristics account for a substantial portion of variance in user retention, highlighting the strategic importance of system design decisions in digital commerce environments. The validated structural model provides researchers with a robust theoretical framework for future investigations into omnichannel information systems management. Finally, this study advances theoretical understanding of the role of social interactivity in digital commerce by demonstrating its significant impact on user attitudes toward omnichannel systems. This finding bridges information systems literature with social

commerce theory, offering new insights into how social dimensions of information systems influence user engagement and retention across integrated channels. Our research establishes social interactivity as a fundamental component of effective omnichannel information systems rather than merely an optional feature.

5.3. Managerial implications

Our findings provide valuable guidance for information systems managers and digital commerce professionals implementing omnichannel strategies. First, the strong direct effect of perceived usefulness on customer stickiness suggests that managers should prioritize system functionality that delivers tangible benefits to users. Information systems departments should implement features that enhance task efficiency, information accessibility, and decision support across all channels. Examples include synchronized shopping carts, cross-channel inventory visibility, and personalized recommendations based on integrated customer data. Second, our confirmation of the significant relationship between perceived ease of use and attitudes toward omnichannel systems highlights the importance of user-centered design principles in information systems development. Managers should invest in streamlined user interfaces, consistent interaction patterns across channels, and intuitive navigation systems. Regular usability testing should be conducted to identify and eliminate friction points in cross-channel customer journeys.

Third, the validated impact of social interactivity on user attitudes provides managers with empirical justification for implementing social features within their omnichannel information systems. Strategic initiatives should include integrated review systems that span online and offline channels, social sharing capabilities for products and experiences, and community-building features that foster engagement with the brand ecosystem. Information systems managers should develop metrics to measure social engagement across channels and correlate these with customer retention indicators. Fourth, the substantial explanatory power of our model demonstrates that systematic management of information system characteristics can significantly enhance customer stickiness. Managers should establish comprehensive frameworks for measuring and optimizing system performance across the dimensions identified in our research. This includes developing key performance indicators for usefulness, ease of use, and social interactivity, and tracking these metrics in relation to customer retention outcomes. Finally, our findings underscore the importance of integrated information systems architecture that supports seamless customer experiences across channels. IT managers should prioritize projects that eliminate data silos, synchronize customer information across touchpoints, and enable real-time service delivery regardless of channel. Investment in robust backend systems that support frontend channel integration will yield significant returns through enhanced customer stickiness and increased lifetime value.

By implementing these recommendations, information systems managers can strategically design and deploy omnichannel systems that optimize customer engagement, strengthen competitive advantage, and drive sustainable business growth in increasingly complex digital marketplaces.

5.4. Limitations and further research

This study provides valuable insights into the factors influencing customer stickiness in omnichannel information systems, but several limitations warrant acknowledgment. First, the cross-sectional nature of our data collection prevents examination of how the relationships between system characteristics and customer stickiness evolve over time, particularly as users gain familiarity with omnichannel systems. Second, while our demographic distribution is relatively balanced, the findings may not fully generalize to all cultural contexts and information systems environments. Third, our research focused primarily on perceived usefulness, perceived ease of use, and social interactivity, potentially overlooking other information systems characteristics that might influence customer stickiness in omnichannel environments.

Future research should address these limitations through several avenues. Longitudinal studies would provide valuable insights into how information systems acceptance and customer stickiness evolve throughout the technology adoption lifecycle, enabling managers to optimize systems for both new and experienced users. Researchers should also investigate how system security and privacy features influence trust and subsequent stickiness in integrated omnichannel environments, especially as data flows across multiple touchpoints. Additionally, examining how emerging technologies such as artificial intelligence and augmented reality can be integrated into omnichannel information systems to enhance perceived usefulness and social interactivity represents a promising research direction. Further investigation into the differential effects of system characteristics across specific demographic segments would provide information systems managers with more nuanced implementation strategies for targeted user groups. Finally, exploring the integration of the extended TAM model with other theoretical frameworks, such as the DeLone and McLean IS Success Model, could provide a more comprehensive understanding of information systems success in omnichannel retail contexts.

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