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The role of channel integration quality in shaping consumer behavior in omnichannel and multi-channel retail

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ABSTRACT

Purpose: This study examines how channel integration quality influences consumer behavior—specifically satisfaction, purchase intentions, and brand loyalty—in omnichannel and multi-channel retail environments. It aims to highlight cross-country differences by comparing the Turkish and Kazakhstani markets.

Design/methodology/approach: Grounded in the Stimulus-Organism-Response (SOR) framework, the study uses survey data collected from 402 consumers in Turkey and Kazakhstan. Channel integration quality is operationalized through service channel configuration and interaction consistency. Structural equation modeling is used to assess the proposed relationships.

Findings: Results reveal significant differences across countries. In Kazakhstan, channel integration quality strongly influences customer satisfaction and brand loyalty, supporting the value of seamless omnichannel experiences. In contrast, Turkish consumers show no significant association between channel integration quality and satisfaction, suggesting that mobile applications operate more as standalone channels rather than as part of an integrated system.

Originality/value: This study provides cross-market insights into the effects of channel integration quality, contributing to omnichannel retailing literature by uncovering how cultural and technological contexts shape consumer responses in different countries. It highlights the importance of localized omnichannel strategies to drive customer satisfaction and brand loyalty.

Introduction

The global retail landscape is undergoing a significant transformation characterized by a sustained increase in retail sales, particularly driven by the growth of online commerce. Notably, the role of online sales in the retail industry is becoming increasingly prominent, with projections suggesting that by 2027, nearly 25 % of total global retail sales will be attributable to the online segment (Statista, 2024a). This shift is mirrored in consumer behavior globally, as evidenced by recent studies indicating that, on average, 56 % of smartphone users utilized their devices to purchase groceries between July 2022 and June 2023, reflecting the widespread adoption of online shopping (Statista,

2024b).

In line with these global developments, Turkey has also seen substantial growth in its e-commerce sector. The e-commerce volume in Turkey surged by 115.15 % in 2023 compared to the previous year, with the share of e-commerce in overall trade volume rising from 10.1 % in 2019–20.3 % in 2023 (Trade, 2024). Similarly, in Central Asia, Kazakhstan has experienced a notable expansion in e-commerce, with its share in retail trade reaching 12.5 % in 2022, representing a nearly nine percent increase over the previous year (Statista, 2024c). This growth trajectory is further supported by increasing mobile internet penetration, which is expected to reach 92.19 % by 2029, marking a significant enhancement in digital accessibility (Statista, 2023). In addition, Turkey

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and Kazakhstan exhibit contrasting digital and cultural profiles, which enables testing the robustness of the effects of channel integration quality within the S-O-R model beyond a single market.

Despite the proliferation of online shopping, physical retail stores continue to maintain their relevance, as a significant proportion of consumers still prefer in-person shopping experiences (Smit, 2023). This coexistence of online and offline consumer preferences has catalyzed the development of omnichannel retail strategies, which aim to create a seamless, integrated experience across multiple channels. Retailers are increasingly focused on reducing customer friction and providing a cohesive shopping journey, irrespective of whether interactions occur online or offline (Stewart, 2024). Leading retailers, including industry giants such as Rakuten, Walmart, Alibaba, and Amazon, are investing heavily in omnichannel and multi-channel approaches to preserve their competitive edge (Gao and Huang, 2021). The conceptual distinction between multichannel and omnichannel retailing lies in the fact that, in the former, channels operate independently without interfering with one another. By contrast, omnichannel retailing entails the coordinated operation of all channels within a single platform. Within such a platform, each channel "sees" what the others are doing and can adjust its policies and strategies accordingly. Omnichannel retailing presupposes a unified view of value and profit generation in a product or service market that is more complex than the configuration represented by multichannel setups. As a result, a synergistic effect is achieved across channels, which increases the market value of the product or service. Unlike multichannel retailing, this form requires interaction between online and offline environments (Cicea et al., 2023), that is, integration of these channels.

In turn, omnichannel integration is grounded in the logic of open innovation, whereby firms create value through external knowledge and partnerships (platforms, payment providers, logistics, UGC). The ultimate impact depends not on the number of partners but on how the ecosystem and rules of engagement among participants are designed. Therefore, channel integration quality is not accidental; it is the result of competent configuration and coordination of these linkages (Bogers et al., 2018; West and Bogers, 2014; Dahlander et al., 2021). Channel integration quality can influence consumer behavior through relationship-quality metrics tested under boundary conditions, including the number of channels used in the purchase process (Chen et al., 2023). Channel integration has become a critical factor in ensuring that retailers remain competitive and in demand within the industry (Natarajan et al., 2023). Empirical studies show that the quality of channel integration positively affects purchase intentions and increases basket size (Cocco and Demoulin, 2022).

In recent decades, scholarly interest in this field has significantly increased. However, previous studies still present certain limitations. Most of them rely on single-country samples collected in China, Latin America, or selected European markets, which makes it difficult to generalize the findings to other emerging economies such as Turkey or Kazakhstan (Buckley and Feldman, 2024; Zhang et al., 2018; Nguyen, 2021; Pereira et al., 2023). Only a few studies have examined cross-national differences in multichannel or omnichannel consumer behavior (Lu et al., 2018), and those that have focused primarily on other regions; therefore, a comparative analysis of two emerging markets within one study helps to address this gap.

In light of these dynamics, a critical research question emerges: To what extent does the quality of channel integration impact consumer satisfaction, shopping intentions, and loyalty to retail brands? Additionally, what role does channel integration quality play within the broader "Stimulus-Organism-Response" (SOR) framework in shaping consumer behavior across both omnichannel and multi-channel contexts?

Novelty of this study. We theoretically refine and empirically test cognitive satisfaction as the organismic mediator linking channel integration quality to key outcomes (purchase intentions and loyalty), while simultaneously conducting a comparative analysis with consumer data

from Turkey and Kazakhstan to enhance external validity and surface context-specific differences, and explicitly contrasting omnichannel and multichannel settings. In doing so, the study extends the S-O-R framework by adding a cross-national comparative module to the stimulus-organism-response mechanism and by clarifying the role of satisfaction as a predominantly cognitive link through which channel integration quality shapes consumer behavior.

By providing insights into these relationships, the study aims to contribute to the expanding body of literature on omnichannel and multi-channel strategies, thereby bridging existing gaps concerning the antecedents and outcomes of consumer behavior in integrated retail environments.

Literature review and hypothesis development

Channel integration quality and consumer behavior in the SOR framework

To analyze the role of channel integration quality in shaping consumer behavior, this research utilizes the Stimulus-Organism-Response (S-O-R) model proposed by Mehrabian (1974). The S-O-R model is particularly relevant in this context as it provides a comprehensive framework for understanding how environmental stimuli, such as channel integration quality, affect consumer attitudes and behaviors through internal cognitive and emotional processes. This model effectively connects three components: environmental stimuli (stimulus), internal states of individuals (organism), and subsequent behavior (response). In the context of this study, this framework helps to understand how the quality of channel integration serves as a stimulus that impacts consumer behavior through internal cognitive processes (Said Basalamah et al., 2024). By stimulating the psychological perception of consumers, consumers are stimulated by the emotional state of motivation to buy and are guided by this motivation to strengthen one's intention to make a purchase, which leads to purchasing behavior (Lin and Shen, 2023).

In this study, the stimuli are represented by channel-service configuration and interaction consistency. The response is captured by consumer outcomes such as continuance intention to use shopping and customer loyalty to the shopping store. Channel integration quality is defined as a firm's capability to provide a seamless shopping experience across all channels (Sousa and Voss, 2006). It consists of two main dimensions: channel service configurations (e.g., breadth of channel selection, transparency of channel service) and integrated interactions (e.g., consistency of content, process sequences, and perceived smoothness) (Lin et al., 2023). The significance of channel integration quality in influencing customer interactions within omnichannel retail has been extensively documented in the literature (Lee et al., 2019). Meanwhile, a study by Widjaja et al., also revealed the relationship between the perception of service quality and satisfaction. This study was conducted in the field of e-commerce in Indonesia. in order to determine the impact of utilitarian value, hedonistic value, the quality of channel integration on the intention to make purchases through all channels and customer satisfaction (Widjaja et al., 2022).

In an omnichannel environment, channel integration quality functions as a key stimulus (S) that shapes organismic states-trust, perceived value, and satisfaction (O)-which, in turn, determine behavioral responses (R), ranging from impulse purchases to cross-channel retention. This causal chain is supported by recent S-O-R models in omnichannel retailing (Pereira et al., 2023; Choubey and Gautam, 2024; Liu et al., 2024; Liu and Hassan, 2024).

Crucially, the same stimulus may be perceived differently across cultural contexts. Because culture is a central antecedent shaping online shopping behavior, retailers should adapt digital marketing strategies to cultural differences among consumers (Pratesi et al., 2021). Cross-cultural studies of online behavior further show that cultural dimensions influence the transition from service-related stimuli to trust/affective states and ultimately to behavior, making the S–O–R

framework highly appropriate for cross-national comparisons (Nam et al., 2020).

Channel-service choice breadth

A broad range of available channels enhances the quality of channel configurations. Potential indicators of this dimension include the extent to which customers can choose alternative channels for a given service (parallel channel mode) and the ability to complete preferred tasks across different channels (additional channel mode) (Sousa and Voss, 2006). Retailers that offer multiple distribution channels are better positioned to meet diverse customer needs and thereby foster greater loyalty. Wallace et al. (2004) demonstrated that customers using three or more channels of interaction exhibited 66 % higher engagement than those using only one channel. Empirical results prove that the more channels consumers can choose, the easier it is for them to use them to solve their shopping tasks. A sufficient choice of channels gives customers the freedom to choose different channels at different stages (for example, at the purchase stage, at the payment stage) (Chai and Wang, 2022). Additionally, the availability of multiple channels reduces the likelihood of customers switching brands (Ellahi et al., 2024). Research by Madaleno et al. (2007) further highlighted the positive impact of multi-channel consistency on customer satisfaction, encompassing aspects such as channel satisfaction, product satisfaction, and payment fairness. Based on these findings, we propose the following hypothesis:

H₁. The breadth of sales channel choices has a positive effect on purchase satisfaction.

Channel-service configuration transparency

Transparency in service channels refers to informing customers about all available channels and ensuring familiarity with the service parameters across these channels (Wu and Chang, 2016). Sousa and Voss (2006) argued that greater transparency in channel configurations leads to enhanced channel quality. Indicators of transparency include customers' awareness of available channels and their understanding of the differences between services offered by each channel. The results of the study by Chai & Wang, show that the transparency of channel maintenance has a significant positive effect on both perceived usefulness and perceived ease of use. This means that the more transparent the information about the available channels, the more useful a omnichannel system is for consumers (Chai and Wang, 2022). Shen et al. (2018) suggested that higher transparency facilitates easier channel switching, enhancing the overall customer experience. Therefore, we hypothesize:

H₂. Transparency in service channel configuration has a positive effect on customer satisfaction.

Content consistency

Content consistency refers to the uniformity of information shared across various channels (Shen et al., 2018). Ensuring content consistency allows consumers to receive consistent responses irrespective of whether they engage online or offline, thus fostering trust and facilitating better decision-making (Lee et al., 2019; Lin et al., 2023). Consistent content can also help reduce consumer confusion by ensuring a transparent flow of information, especially regarding inventory and promotions (Rangaswamy and Van Bruggen, 2005). While some studies have found no statistically significant relationship between content consistency and purchase intention (Kılıç and Tutan, 2022; Ryu et al., 2023), we hypothesize:

H₃. Content consistency has a positive effect on shopping satisfaction.

Process consistency

Process consistency refers to the alignment of relevant attributes across channels, such as service quality, waiting times, and overall experience (Sousa and Voss, 2006). When companies maintain consistent processes across different channels, customers are more likely to trust the brand and maintain stable expectations of service quality (Choi, 2020). Process consistency, including visual and functional aspects, is essential for effective customer engagement and fostering trust (Nguyen, 2021; Lin et al., 2023). Hence, we hypothesize:

H₄. Process consistency has a positive effect on shopping satisfaction.

Satisfaction from shopping experience

Customer satisfaction is a multifaceted concept with both academic and consumer perspectives. Academically, satisfaction is viewed either as a process or an outcome. The process perspective focuses on the evaluation between received outcomes and expected outcomes, commonly following the expectation-disconfirmation paradigm, where satisfaction results from positive disconfirmation and dissatisfaction from negative disconfirmation. The outcome perspective considers satisfaction as a resulting emotional state from specific consumption experiences, often described as pleasure, contentment, or relief (Parker and Mathews, 2001). Additionally, consumers interpret satisfaction through various dimensions, such as evaluating received value against expectations, feelings of contentment or happiness, and fulfillment of needs or wants, with context shaping satisfaction across different products, services, and retail encounters. Customer satisfaction also serves as a strategic asset, where its measurement reflects company success and customer loyalty, impacting overall business performance and customer retention (Fornell et al., 2020). Previous studies indicate that customer satisfaction positively influences both loyalty and future purchase intentions (Suardhita et al., 2024; Chikazhe et al., 2021; Manyanga et al., 2022). Thus, we propose two interrelated hypotheses:

H₅. Satisfaction with purchases positively affects future purchase intentions.

H₆. Satisfaction with purchases positively affects customer loyalty to the store.

Research methodology

A quantitative study was developed to achieve the purpose of the study. We selected Kazakhstan and Turkey because these markets differ in the maturity of their omnichannel practices and in their cultural profiles-conditions that are crucial for testing the S-O-R mechanism, specifically the role of cognitive satisfaction as a mediator. A survey was conducted in Kazakhstan and Turkey, which consisted of three parts. The first part included filtering questions (whether respondents had ever used apps, if so, in which store and for what purpose), as well as determining behavioral characteristics (how often participants shop in stores, how often they use apps). The second part was devoted to the participants' attitude to the operation of the application and physical storage (for testing the model), and the third part was devoted to studying consumer satisfaction when shopping, their loyalty and the intention to continue shopping.

The study identified demographic (age and gender) and socio-economic (monthly income, city of residence, etc.) characteristics of participants in sales channels.

Developed research model

Seven variables were used in the research model, and based on a review of the literature, six hypotheses were proposed, as shown in Figure 1: Channel Integration Quality as Stimulus, Satisfaction from
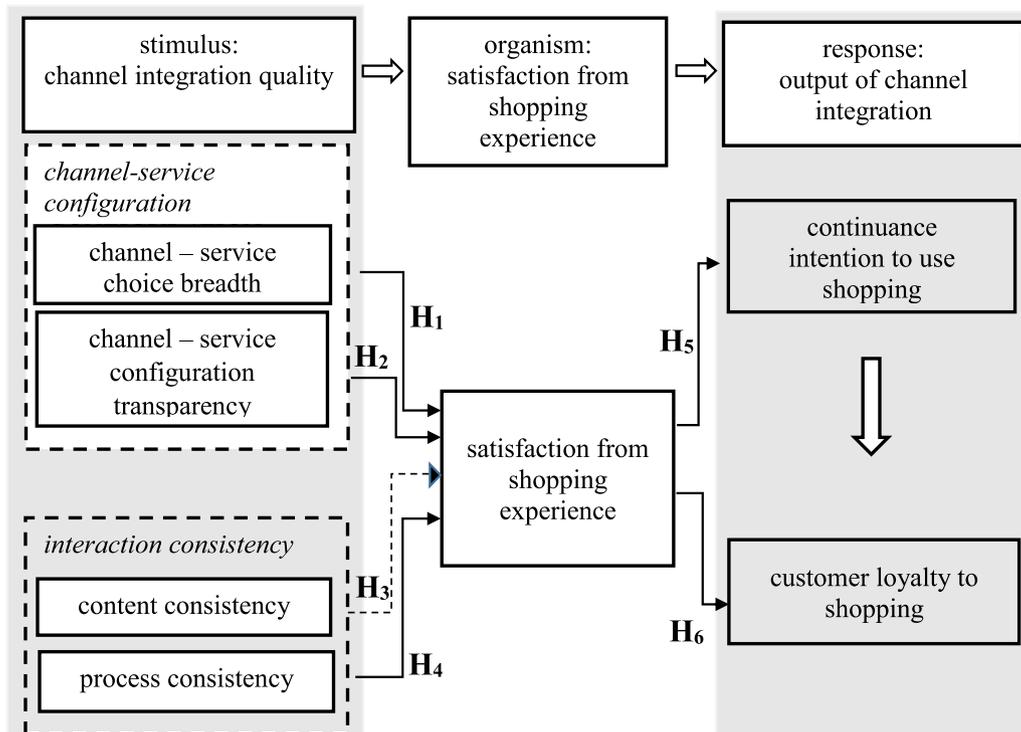
Fig. 1. Research Model, **Source:** Developed by the authors.

Shopping as Organism, and Output of Channel Integration as Response.

In more detail, Channel Integration Quality consists of Channel-Service Configuration (Channel-Service Choice Breadth and Channel-Service Configuration Transparency) and Interaction Consistency (Content Consistency and Process Consistency). The Output of Channel Integration includes Continuance Intention to Use Shopping and Customer Loyalty to Shopping Store.

Measurement development

To evaluate each element of the model and increase the reliability of the study content, several elements from the existing literature were adapted. The quality of channel integration, namely the breadth of channel and service selection, was measured using the widely used scales of Gao and Huang (2021), and Lee et al. (2019). The scales proposed by Gao and Huang (2021), Natarajan et al. (2023), as well as Lee et al. (2019), were used to measure the transparency of the service channel configuration.

The scales proposed by Gao and Huang (2021) and Lee et al. (2019) were used to measure consistency of content and process. Satisfaction with purchases was measured using a scale proposed by Machleit et al. (2000), and the intention to continue shopping was measured by Sepasgozar et al. (2019).

Finally, the scores of the scale used by Sundjaja et al. (2024) were used to measure loyalty. The scores were checked for their intelligibility during a preliminary test in which ten master's and PhD students took part, and subsequently their wording was slightly changed. For the convenience of respondents from Turkey and Kazakhstan, all questions were translated into Russian and Turkish. All questions were rated on a Likert scale of 1 (strongly disagree) to 5 (strongly agree) (see Table 1). We selected the 5-point format because it is widely used in cross-national research due to its simplicity, ease of interpretation, and lower respondent burden – factors that are especially important when working across different languages and cultures. While 7-point scales can offer finer granularity, the 5-point format provides a more balanced trade-off, helping to avoid excessive complexity that may reduce data

quality in multilingual or multicultural settings.

Data collection and sample characteristics

The data was collected using an online survey of app users to test hypotheses and achieve the research goal. Despite the advantages of online data collection, such as the elimination of geographical restrictions, there are some limitations, such as respondents' computer skills Malhotra (2007). However, this limitation was not applicable in this study, as the purpose of the study was to explore the use of applications, and respondents were selected based on their use of applications. Thus, it was assumed that the participants had sufficient phone/computer skills to fill out the questionnaire online.

To test the hypotheses, structural equation modeling (SEM) was used, for which Hoelter (1983) proposed a minimum sample size of 200 participants. To meet the minimum sample size requirements proposed by Hoelter (1983), as well as Hair et al. (2011) and Hair et al. (2014), 400 participants (200 from Kazakhstan and 200 from Turkey) who had already used the applications were included in this study. It was assumed that users of the application would be able to answer questions online. In addition, when collecting data online, researchers had the opportunity to track information about participants in real time, avoid double responses from the same respondent, and exclude those who did not complete the questionnaire in full. Preference was given to the web-based survey because it is more convenient and economical, participants could be contacted faster, and responses could be collected and stored electronically more efficiently (Boyer et al., 2002).

Data were collected online between June and July 2024 using a quota sampling approach, originally introduced by Moser and Stuart (1953) in an experimental study. Quota sampling is a probability sampling method in which samples are selected based on probabilities proportional to the distribution of a variable in the population (Rukmana, 2014). In this study, we implemented quota sampling by pre-specifying target gender proportions in accordance with official statistics and recruiting participants until each quota was met. This procedure enhanced the cross-country comparability of the results.

Table 1
List of constructs and their items.

Construct	Items	References
Channel-service choice breadth	CCB1: I can buy products through the physical store and the app.CCB2: I can acquire technical support through the physical store and the app. CCB3: I can provide feedback about the products through the physical store and the app.	adapted from Gao and Huang (2021)andLee et al. (2019)
Channel-service configuration transparency	CCT1: I know the differences in services through the physical store and the app.CCT2: I am familiar with the services of the physical store and the app. CCT3: I know how to utilize the available services of the physical store and the app.	adapted from Gao and Huang (2021)Natarajan et al. (2023),andLee et al. (2019)
Content consistency	CC1: The product prices are consistent across the physical store and the app.CC2: The supermarket provides consistent promotion information across the physical store and the app.CC3: The supermarket provides consistent product information across the physical store and the app.	adapted from (Gao and Huang, 2021) andLee et al. (2019)
Process Consistency	PC1: The levels of customer service are consistent across the physical store and the app.PC2: The service images are consistent across the physical store and the app.PC3: The feelings of service are consistent across the physical store and the app.PC4: The channels have consistent performance in the speed of service delivery.	adapted from Gao and Huang (2021)andLee et al. (2019)
Satisfaction from shopping experience	SSE1: I enjoyed my shopping experience SSE2: I was satisfied with my shopping experience SSE3: Next time, I will probably repeat the same experienceSSE4: I would recommend my shopping experience to other people.	adapted from Machleit et al. (2000)
Continuance intention to use shopping	CIU1: I intend to continue using this app in my future shopping. CIU2: I always try to use this app in my shopping.CIU3: I encourage everyone to use this app for shopping.CIU4: If this app is available for my shopping, I wouldn't think about leaving it.	adapted from Sepasgozar et al. (2019)
Customer loyalty to shopping store	SL1: I will still shop at this store in the future.SL2: I think that in the future, I will be shopping at this store.SL3: I recommend this store to others.	adapted from Sundjaja et al. (2024)

Table 2 shows the demographic characteristics of the sample population in Kazakhstan and Turkey.

Data were collected using an online survey targeting users of shopping applications to test the hypotheses and achieve the research objectives. The sample had a balanced gender representation across the selected countries, with similar numbers of women and men in both Turkey and Kazakhstan. The study focused on participants from large cities. Turkish participants were primarily from Istanbul (49 %), Izmir (11 %), and Ankara (9.5 %), with the remainder (31 %) from other cities. In Kazakhstan, the majority of participants resided in Almaty

Table 2
Sample Characteristics.

		Kazakh Sample		Turkish Sample	
Place of Residence	Almaty	145 (72.1 %)		Istanbul	98 (48.8 %)
	Astana	24 (11.9 %)		Ankara	19 (9.5 %)
	Shymkent	25 (12.4 %)		Izmir	22 (10.9 %)
	Others	7 (3.5 %)		Others	62 (30.8 %)
Gender	Female	100 (49.8 %)		Female	97 (48.3 %)
	Male	101 (50.2 %)		Male	104 (51.7 %)
Monthly Income	Up to 44,000₸	18 (9.0 %)		Up to 17,000 ₺	103 (51.2 %)
	44,001₸ - 85,000₸	21 (10.4 %)		17,001 ₺ – 35,000 ₺	71 (35.3 %)
	85,001₸ - 120,000₸	21 (10.4 %)		35,001 ₺ – 58,000 ₺	21 (10.4 %)
	120,001₸ – 250,000₸	38 (18.9 %)		58,001 ₺ – 80,000 ₺	4 (2.0 %)
	250,001₸ and above	103 (51.2 %)		80,001 ₺ and above	2 (1.0 %)
Age	18 – 20	78 (38.8 %)		18 – 20	22 (10.9 %)
	21 – 25	33 (16.4 %)		21 – 25	120 (59.7 %)
	26 – 35	53 (26.4 %)		26 – 35	33 (16.4 %)
	36 – 45	37 (18.4 %)		36 – 45	26 (12.9 %)
Mobile App Use Frequency	Rarely	51 (25.4 %)		Rarely	48 (23.9 %)
	Sometimes	67 (33.3 %)		Sometimes	49 (24.4 %)
	Often	42 (20.9 %)		Often	9 (4.5 %)
	Usually	23 (11.4 %)		Usually	40 (19.9 %)
	Always	18 (9.0 %)		Always	55 (27.4 %)
Last Time Used Mobile App	Magnum	138 (68.7 %)		Migros (Hemen)	44 (21.9 %)
	Galmart	20 (10.0 %)		BİM	32 (15.9 %)
	FixPrice	13 (6.5 %)		A101	32 (15.9 %)
	Airba Fresh	7 (3.5 %)		ŞOK	33 (16.4 %)
	Esentai Gourmet	4 (2.0 %)		Migros (Sanal Market)	25 (12.4 %)
	Others	19 (9.4 %)		Others	35 (17.4 %)
N		201 (100 %)		201 (100 %)	

(72.1 %), followed by Astana (12 %) and Shymkent (12 %), with 3.5 % from other cities. The populations of Almaty, Astana, and Shymkent were 2,228,677, 1,430,117, and 1,222,066, respectively (Bureau of National Statistics, 2024a).

There were notable differences in age composition, monthly income, and the frequency of use of store applications between participants from Turkey and Kazakhstan. In Turkey, the largest age group was 21–25 years (59.7 %), followed by 26–35 years (16.4 %), 36–45 years (12.9 %), and 18–20 years (10.9 %). According to official Turkish statistics, the age distribution of the population was as follows: 0–19 years (29 %), 20–24 years (8 %), 25–34 years (15 %), 35–44 years (15 %), and 45–54 years (13 %) (TÜİK, 2025). In Kazakhstan, the largest group was aged 18–25 years (38.8 %), followed by 26–35 years (26.4 %), 36–45 years (18.4 %), and 21–25 years (16.4 %). Government statistics indicate that the age distribution was as follows: 0–18 years (34 %), 18–25 years (10 %), 26–35 years (14 %), 36–45 years (14 %), and 46–55 years

(11 %) (Bureau of National Statistics, 2024a).

Monthly income also varied between respondents from Turkey and Kazakhstan. In Turkey, over half of the participants (51.2 %) reported an income of 17,000 Turkish liras (approximately 238,000 tenge), while 35.3 % reported incomes between 17,000 and 35,000 Turkish liras. The remaining respondents were distributed as follows: 10.8 % reported incomes between 35,000 and 58,000 Turkish liras, 2.0 % between 58,000 and 80,000 Turkish liras, and 1.0 % above 80,000 Turkish liras. Official Turkish income statistics were not available. In Kazakhstan, more than half of the participants (51.2 %) reported an income above 250,000 tenge, while 18.9 % reported incomes between 120,000 and 250,000 tenge. The rest of the respondents were distributed approximately equally across the remaining income groups: 9–10 % for each of the following ranges – above 85,000–120,000 tenge, above 44,000–85,000 tenge, and up to 44,000 tenge. The average per capita income in Kazakhstan in 2024 was 318,136 tenge, representing a 16.4 % increase from the previous year (Bureau of National Statistics, 2024b).

The study was conducted in retail outlets where store applications were available for customer use. In Turkey, app usage was evenly distributed across various stores. Migros (Hemen) was the most commonly used, followed closely by ŞOK (5.5 % difference), BIM (6.0 %), A101 (6.0 %), Migros (Sanal Market) (9.5 %), and other stores (4.5 %). The frequency of app usage in stores was as follows: 27.4 % always used them, 24.4 % sometimes, 23.9 % rarely, 19.9 % usually, and 4.5 % often. In Kazakhstan, app usage was notably skewed towards Magnum, which was used by 68.7 % of respondents, almost seven times more than the next most popular store. Galmart was the second most used (10.0 %), followed by FixPrice (6.5 %), Airba Fresh (3.5 %),

Esentai Gourmet (2.0 %), and other stores (9.4 %). The frequency of app usage in Kazakhstan was distributed as follows: 33.3 % sometimes, 24.5 % rarely, 20.9 % often, 11.4 % usually, and 9.0 % always.

In summary, the demographic characteristics of the sample varied between countries, which may have implications for the study's findings regarding age, monthly income, and the frequency of store application usage when shopping.

Analysis and results

Construct reliability and validity

Prior to testing the structural model, evaluations of internal consistency, convergent validity, and natant validity were conducted to ensure the robustness of the measurement model. Internal consistency was assessed using Cronbach's alpha coefficients, with values exceeding the threshold of 0.60 considered acceptable (Malhotra, 2007). Convergent validity was assessed according to the criteria established by Fornell and Larcker (1981). These criteria specify that (1) all factor loadings must be statistically significant and exceed 0.70, and (2) the average variance extracted (AVE) for each construct must exceed the variance due to measurement error, specifically surpassing 0.50.

Discriminant validity was evaluated using the Heterotrait-Monotrait (HTMT) ratio, adopting a threshold of 0.85 as recommended by Henseler et al. (2015) and Voorhees et al. (2016).

Table 3 shows that both composite reliability scores and Cronbach's alpha coefficients for all constructs were above 0.8, indicating high reliability and strong internal consistency of the measures. The factor

Table 3
Evaluation of scales for construct reliability and convergent validity.

Construct	Items	M (SD)	Loading (λ)	Cronbach's α	Dijkstra-Henseler's rho (ρA)	Jöreskog's rho (ρc)	AVE
Channel – Service Choice Breadth	CCB1	3.72 (1.08)	0.886[a] 0.892[b]	0.837[a]	0.848[a]	0.839[a]	0.637[a]
	CCB2	3.49 (1.10)	0.784[a] 0.790[b]				
	CCB3	3.58 (1.07)	0.714[a] 0.719[b]				
Channel Service Configuration Transparency	CCT1	3.26 (1.19)	0.659[a] 0.610[b]	0.855[a]	0.877[a]	0.859[a]	0.674[a]
	CCT2	3.60 (1.09)	0.889[a] 0.824[b]				
	CCT3	3.62 (1.08)	0.893[a] 0.828[b]				
Content Consistency	CC1	3.26 (1.21)	0.770	0.870	0.877	0.871	0.694
	CC2	3.44 (1.12)	0.811				
	CC3	3.56 (1.09)	0.913				
Process Consistency	PC1	3.39 (1.13)	0.892	0.912	0.915	0.913	0.724
	PC2	3.49 (1.12)	0.867				
	PC3	3.36 (1.13)	0.866				
	PC4	3.45 (1.08)	0.774				
Satisfaction from Shopping Experience	SSE1	3.81 (1.05)	0.952	0.935	0.936	0.935	0.879
	SSE2	3.83 (1.09)	0.923				
Continuance Intention to Use	CIU1	3.68 (.98)	0.899[a] 0.905[b]	0.935[a]	0.936[a]	0.936[a]	0.784[a]
	CIU2	3.64 (1.00)	0.879[a] 0.901[b]				
	CIU3	3.47 (1.03)	0.852[a] 0.827[b]				
	CIU4	3.72 (.99)	0.911[a] 0.905[b]				
Customer Loyalty	CL1	3.63 (1.01)	0.940[a] 0.895[b]	0.942[a]	0.943[a]	0.943[a]	0.846[a]
	CL2	3.67 (1.02)	0.922[a] 0.878[b]				
	CL3	3.56 (1.04)	0.896[a] 0.860[b]				
Channel-Service Configuration				0.903[b]	0.911[b]	0.903[b]	0.612[b]
Sustained Customer Loyalty				0.960[b]	0.961[b]	0.961[b]	0.778[b]

[a] Before merging the constructs
[b] After merging the constructs

Table 4
Discriminant validity among the constructs.

	CSC	CC	PC	SSE	R²
CC	0.778				
PC	0.773	0.674			
SSE	0.779	0.647	0.679		0.628
SCL	0.789	0.703	0.658	0.796	0.633

loadings for all items exceeded 0.6 on their respective constructs, indicating acceptable item convergence. Furthermore, the AVE values ranged from 0.637 to 0.879, all surpassing the critical threshold of 0.50 as recommended by Hair et al. (2014). Therefore, the criteria for convergent validity were satisfied.

To assess discriminant validity, we applied the Heterotrait-Monotrait (HTMT) criterion as recommended by Henseler et al. (2015) because it shows the limited sensitivity of the Fornell–Larcker criterion in detecting discriminant validity problems and the superior performance of HTMT. The HTMT ratio between the constructs Channel–Service Choice Breadth and Channel Service Configuration Transparency was found to be 0.900, which significantly exceeded the recommended cutoff value of 0.85. As a result, these two constructs within the Channel-Service Configuration were merged into a single construct, following the guidance provided by Henseler et al. (2015). This high correlation suggests that customers who perceive a broad range of service options also tend to perceive greater transparency in how those options are configured and delivered.

Similarly, the constructs Customer Loyalty and Continuance Intention to Use exhibited an HTMT ratio of 0.931, surpassing the 0.85 threshold. This high correlation was expected, as theoretical assumptions suggest that customer loyalty is closely linked to the intention to continue using a service or product. Consequently, these two constructs were combined into a single construct, labeled Sustained Customer Loyalty. The high correlation between these constructs is understandable, as loyal customers are typically more inclined to continue using a service or product. Loyalty often involves a strong emotional or habitual attachment, which fosters the intention to maintain usage.

In complex models, conceptually distinct constructs may exhibit high correlations due to their interactions within the model. Combining such constructs can simplify the model, improve interpretability, and enhance its validity by reducing complexity, ensuring that the constructs represent unique dimensions without undue overlap. This process helps to create a more parsimonious model, ultimately leading to more reliable and meaningful results.

Model's goodness of fit

The structural model was evaluated using partial least squares path modeling (PLS-PM) to estimate the structural equation models and test the proposed hypotheses (Wold, 1982). PLS-PM was chosen primarily for its strong foundation in regression analysis, which effectively minimizes residual variances in the observed variables (Hair et al., 2011; Merli et al., 2019). This approach is particularly beneficial in ensuring robust model estimation.

Additionally, as a flexible structural equation modeling technique, PLS-PM facilitates the examination of complex relationships among variables, including direct, indirect, and moderating effects (Nitzl et al., 2016). This method is especially advantageous for exploring intricate interactions in the context of omnichannel retail, where multiple pathways and relationships among constructs must be evaluated simultaneously. The complexity of omnichannel retail, which involves integrating multiple customer touchpoints, necessitates the use of such advanced modeling techniques to adequately capture the dynamic interactions between constructs.

Path analysis and hypotheses testing

Figure 2 presents the results of the structural model analysis. Partial least squares regression (PLS), a non-parametric method, was employed to estimate the structural relationships and test the hypotheses. The bootstrapping resampling technique was used to assess path significance (Henseler et al., 2009). For this analysis, 4999 resamples were generated to ensure robust estimates. The findings indicate that the R^2 values, representing the explanatory power of satisfaction and sustained customer loyalty, were 0.628 and 0.633, respectively. According to Falk and Miller (1992), R^2 values above 0.10 are recommended for a latent construct to be considered acceptable, while values between 0.33 and 0.67 indicate a moderate effect size (Chin, 1998).

Path coefficients were analyzed across the Turkish, Kazakhstani, and consolidated samples, applying significance thresholds of 0.01 and 0.05. Both direct and indirect effects are summarized in Table 5. The results demonstrate that the relationship between satisfaction and sustained customer loyalty is significant across all samples, underscoring the consistent impact of customer satisfaction on loyalty outcomes. However, differences emerged in the influence of channel integration quality on satisfaction across different contexts. Specifically, the paths from channel service configuration and process consistency to satisfaction were significant for the Kazakhstani sample but not for the Turkish sample. Furthermore, the relationship between content consistency and satisfaction was found to be non-significant across all samples.

These findings highlight that, while the overall model shows a strong relationship between satisfaction and customer loyalty, the effects of individual components of channel integration quality—such as channel service configuration and content consistency—are context-dependent. This suggests that cultural or regional factors may play a role in how consumers perceive and respond to different aspects of channel integration, necessitating a tailored approach for different markets.

Mean differences between Kazakhstani and Turkish Samples

Following the examination of the relationships between the constructs and the identification of differences between the Turkish and Kazakhstani samples, an analysis of group differences in the constructs was conducted using independent sample *t*-tests.

The results indicate that the Turkish sample exhibited significantly higher mean scores across all constructs. Specifically, process consistency, satisfaction with the shopping experience, and sustained customer loyalty were significantly higher in the Turkish sample, with significance levels at the 99 % confidence interval. Additionally, the mean score for channel–service configuration in the Turkish sample was significantly greater than that of the Kazakhstani sample, with a significance level at the 95 % confidence interval.

These findings suggest that cultural or market-specific factors may contribute to the observed differences between the two samples. Retailers operating in these regions should consider these variations when designing their omnichannel strategies to better meet consumer expectations and enhance the overall shopping experience.

Discussion

This study aimed to explore the influence of channel integration quality on customer satisfaction and loyalty. The findings support our hypotheses that transparency in service channel settings and consistency in interactions positively impact customer satisfaction and brand loyalty in the Kazakhstani sample. These results align with previous research, which has shown that service channel configuration, interaction consistency, and guarantee quality enhance customer acquisition and retention programs, thereby fostering customer loyalty (Gao and Huang, 2021). In addition, the Natarajan et al. study showed that the configuration of service channels has a positive effect on the quality of relationships with customers using omnichannel channels (Natarajan
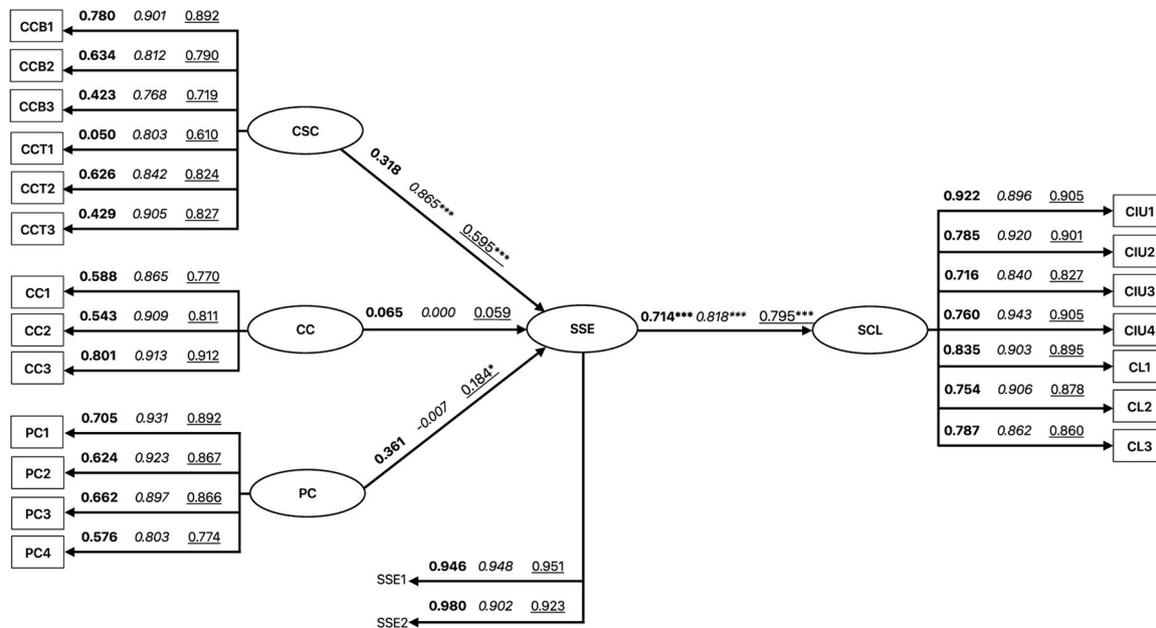
Fig. 2. Path coefficients of the structural model. **Note.** *The figures in bold represents the path coefficient of the Turkish sample (N = 201), The figures in italic represent the path coefficient of the Kazakh sample (N = 201), The underlined figures represent the path coefficient of the consolidated sample (N = 402), *p < .05, ***p < .01.*

Table 5
Path coefficients and total effects.

Path	Direct Effect	Indirect Effect	Cohen's f²
CSC → SSE	**0.318**0.865***0.595***		**0.095**0.6420.270
CC → SSE	**0.065**0.0000.059		**0.004**0.0000.003
PC → SSE	**0.361**-0.0070.184*		**0.105**0.0000.003
SSE → SCL	**0.714***0.818***0.795***		**1.040**2.0211.721
CSC → SCL		**0.227**0.707***0.473***	
CC → SCL		**0.047**0.0000.047	
PC → SCL		**0.258**-0.0060.146*	

Note. The figures in bold represents the path coefficient of the Turkish sample (N = 201)
The figures in italic represent the path coefficient of the Kazakh sample (N = 201)
The underlined figures represent the path coefficient of the consolidated sample (N = 402)
*p < .05
***p < .01

Table 6
Sample differences in the constructs.

Construct	Sample (n = 402)	Mean (std. deviation)	p value
Channel – Service Configuration (CSC)	Turkish (n = 201)	3.65 (.52)	p < .05
	Kazakh (n = 201)	3.44 (1.16)	
Content Consistency (CC)	Turkish (n = 201)	3.49 (.66)	p > .05
	Kazakh (n = 201)	3.34 (1.27)	
Process Consistency (PC)	Turkish (n = 201)	3.73 (.55)	p < .01
	Kazakh (n = 201)	3.12 (1.21)	
Satisfaction from Shopping Experience (SSE)	Turkish (n = 201)	4.02 (.75)	p < .01
	Kazakh (n = 201)	3.61 (1.23)	
Sustained Customer Loyalty (SCL)	Turkish (n = 201)	3.81 (.50)	p < .01
	Kazakh (n = 201)	3.44 (1.16)	

et al., 2023). However, the analysis of the Turkish sample diverges from these findings, as the results indicate that the relationship between service channel configuration, process consistency, and customer satisfaction is not significant. This divergence may be due to differences in cultural attitudes towards service channels or variations in market maturity, which could influence how these factors are perceived and valued by Turkish consumers.

Furthermore, the study's findings regarding the influence of shopping satisfaction on loyalty are consistent with prior research. Previous studies have demonstrated that both the shopping experience and perceived value significantly and positively affect customer satisfaction. In turn, perceived value and customer satisfaction significantly contribute to customer loyalty (Amri et al., 2019; Hamouda, 2019; Kahwaji and Almubayed, 2016; Mubarok et al., 2023). Thus, customer loyalty with a probability of 76.8 % depends on the quality of products and customer satisfaction (Naini et al., 2022).

These contrasting results between the Kazakhstani and Turkish samples suggest that the impact of channel integration quality on customer satisfaction may vary depending on regional or cultural factors. This underscores the need for a nuanced approach when implementing omnichannel strategies across different markets. For the Kazakhstani context, ensuring transparency in service channel settings and maintaining interaction consistency appears to be crucial for fostering customer satisfaction and loyalty. In contrast, the Turkish sample indicates that these factors may not directly lead to increased satisfaction, suggesting that other determinants might play a more substantial role in shaping customer experiences in this context.

Overall, these findings highlight the importance of understanding regional differences in customer behavior and preferences. Retailers should consider these variations when developing omnichannel strategies to ensure they effectively address the specific needs and expectations of consumers in different markets. Practical adjustments could include adapting communication styles to better resonate with local audiences or emphasizing different types of channels based on regional preferences. Tailoring channel integration efforts to align with cultural and regional characteristics could enhance customer satisfaction and ultimately drive loyalty.

Our findings also align with the literature on the limits of openness: increasing the number of partners and interfaces raises coordination

complexity and can reduce effectiveness in the absence of a well-designed architecture and rules of engagement – an inverted U-shaped relationship for the "breadth of search." Consequently, managers should focus on designing the platform architecture of integration and fostering a knowledge-sharing culture, rather than merely "adding more channels/partners" (Laursen and Salter, 2005). This is especially salient for SMEs: open innovation can help offset resource constraints, but it requires precise role definitions and platform metrics to work effectively (Dahlander et al., 2021; Vrande et al., 2009).

Conclusion

The convergence of online and physical sales channels, driven by technological advancements, necessitates a reevaluation of the competitive advantages for retailers and their supply chain partners (Brynjolfsson et al., 2013). Mobile technologies have become particularly influential within the retail sector, providing consumers with enhanced services, increased flexibility, mobility, and greater efficiency through various applications (Rao and Troshani, 2007).

This study revealed significant differences in how service channel configuration and process consistency impact customer satisfaction across different contexts. Specifically, the relationship between service channel configuration, process consistency, and customer satisfaction was found to be significant for the Kazakhstani sample but not for the Turkish sample. This discrepancy may be attributed to the varying degrees of integration of mobile applications into the shopping experience in these two countries, influenced by differences in technology adoption rates, retail infrastructure, and consumer familiarity with digital tools. In Kazakhstan, mobile applications are integrated into the physical shopping process, creating an omnichannel environment in which seamless channel integration is essential. Consequently, service channel configuration and process consistency were found to be key determinants of customer satisfaction. In contrast, in Turkey, mobile applications function more as alternative platforms rather than being fully integrated with the physical shopping experience, resulting in a multichannel rather than an omnichannel approach. Therefore, in an omnichannel context, service channel configuration and process consistency are critical drivers of customer satisfaction, whereas in a multi-channel context, these factors are less influential.

The study, conducted among respondents from both Turkey and Kazakhstan, highlighted several differences between the two countries. For the Kazakhstani sample, service channel configuration and interaction consistency significantly influenced both customer satisfaction and brand loyalty, while these factors were not significant for the Turkish sample. However, the positive relationship between shopping satisfaction and brand loyalty was confirmed for both samples. Importantly, content consistency did not have a significant impact on shopping satisfaction in either the Turkish or Kazakhstani sample. These findings provide a deeper theoretical and practical understanding of the role of channel integration quality in shaping consumer satisfaction and loyalty, both of which are crucial for the success of omnichannel strategies. Retailers can apply these insights by focusing on specific strategies to improve channel integration quality, such as ensuring seamless transitions between online and offline channels and providing consistent service across all platforms. When consumers perceive a high quality of channel integration, they are more likely to continue making purchases and demonstrate loyalty to the brand. Based on these findings, it is recommended that retail companies in both countries focus on enhancing the quality of channel integration to foster greater consumer loyalty.

It is advisable for Turkish retailers to deepen the integration of their apps with other channels – implementing unified sign-on and a single cart, along with seamless deep links from media and social networks – while complementing this with end-to-end attribution to accurately capture channel contributions and improve conversion. Kazakhstani retailers, by contrast, should prioritize transparency and process consistency: unified pricing and policies across all touchpoints, end-to-end order tracking, and predictable SLAs. Such operational clarity will directly increase customer satisfaction and strengthen purchase intentions in an omnichannel environment.

Despite the valuable insights gained from this study, several limitations must be acknowledged. The Turkish sample consisted predominantly of younger respondents, with approximately 70.6 % of participants aged 18–25 years, which may limit the generalizability of the findings to other age groups. Additionally, the Kazakhstani sample was largely composed of users of the Magnum supermarket chain, representing 68.7 % of the sample. A more balanced representation of users from different brands might have yielded different results regarding the impact of content consistency on shopping satisfaction and brand loyalty. Future research could address these limitations by expanding the sample to include a more diverse range of brands and age groups, as well as extending the study to additional countries. Consumer preferences for channel integration quality may vary across different cultural and economic contexts, and understanding these nuances will help validate and extend the findings of this research.

Ethical Statement

This study was conducted in full adherence to internationally recognized ethical standards for academic research. Data were collected through anonymized surveys completed voluntarily by participants. No personal or sensitive information was gathered, and participants' privacy and autonomy were rigorously respected throughout the process.

At the time of data collection, formal approval from an institutional ethics committee was not required by the affiliated institution. Nevertheless, the research followed established ethical guidelines, including obtaining informed consent. Participants were clearly informed about the study's purpose, their right to withdraw at any point, and the confidentiality of their responses.

All data were handled with strict confidentiality, and participation remained entirely voluntary. The principles of transparency, privacy protection, and respect for individual rights were upheld at every stage of the research.

Ethical Statement

All study procedures complied with ethical standards. The instrument was administered via Google Forms. Before the questionnaire began, participants were shown an information page outlining the study purpose, the voluntary nature of participation, the types of questions asked, and the research team's contact details. Participants then provided explicit informed consent by selecting the option "I agree to share my responses"; without this confirmation, the survey could not be completed. No personally identifying information was collected.

CRediT authorship contribution statement

Nazym T. Tulebayeva: Writing – review & editing, Writing – original draft, Methodology, Formal analysis, Data curation, Conceptualization. **Zhanna T. Kozhamkulova:** Writing – review & editing, Writing – original draft, Validation, Investigation, Conceptualization. **Dirsehan Taskin:** Writing – review & editing, Writing – original draft, Validation, Supervision, Funding acquisition, Data curation, Conceptualization.

Declaration of Generative AI and AI-assisted technologies in the writing process

AI-assisted tools were used in a limited, accountable, and transparent manner. Specifically, large language model (LLM) assistants were employed for language polishing and checklist-style editing (grammar, clarity, and formatting) after the scientific content had been drafted by the authors. No generative tool was used to create, analyze, or interpret data, build models, or generate novel claims.

Declaration of Competing Interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Taskin Dirsehan reports article publishing charges was provided by Erasmus University Rotterdam. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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