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# Channel integration quality, perceived fluency and omnichannel service usage: The moderating roles of internal and external usage experience

Xiao-Liang Shen [a], Yang-Jun Li [a], Yongqiang Sun [b,*], Nan Wang [b]

[a] Economics and Management School, Wuhan University, China
[b] School of Information Management, Wuhan University, China

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ABSTRACT

Along with the rapid development of in-store technology, multichannel service is being shifted to omnichannel. By integrating different parallel channels, omnichannel service delivers customers an integrated, seamless and consistent cross-channel shopping experience. To better understand this emerging phenomenon, this study intends to explore the potential drivers of omnichannel service usage. Drawing upon Wixom & Todd framework, this study develops a research model by including object-based beliefs (i.e., channel integration quality) and behavioral beliefs (i.e., perceived fluency). In addition, behavior-based traits (i.e., internal and external usage experience) are hypothesized as moderating the effects of behavioral beliefs on usage behavior. Using an online survey of 401 omnichannel users, the findings demonstrate that channel integration quality significantly affects perceived fluency across different channels, which in turn explains 55% of the variance in omnichannel service usage. The results also show that internal usage experience weakens, whereas external usage experience enhances the effect of perceived fluency on omnichannel service usage. Limitations and implications of this study are further discussed.



## 1. Introduction

Along with the acceleration of technology evolution and the ongoing trend of digitalization, various channels, such as the Internet, mobile phones, tablets, social media, and physical stores, have become available for customers to interact with the retailers. However, these channels are usually designed and managed independently, which is very likely to result in data mismatch and information inconsistency for transition in different channels [1]. As a result, achieving the integration of information and services from multiple available channels is becoming a high priority for retailers, representing a shift from multichannel to omnichannel approach [2]. Omnichannel aims to coordinate the fragmented service processes and technologies in various channels to deliver a consistent and integrated cross-channel experience for customers [2]. It was reported that 76% of the surveyed business leaders regarded the omnichannel strategy as the key business priority, and omnichannel management also ranked 3rd highest on topic importance in service research [3].

Although omnichannel business is attracting increasing interests from both industry and academia worldwide, prior IS studies have placed a great emphasis on single or multiple channels [4,5], and research regarding omnichannel is still in its early stages. Some recent research on omnichannel in information systems and marketing domains largely focuses on proposing research agenda [1,6–8], and addressing the challenges and opportunities in omnichannel practices from a firm-level perspective [9,10], rarely exploring the role of customers in omnichannel business. It is necessary to notice that, although the retailers have recognized the significance of omnichannel and began to implement their omnichannel strategies, the extent to which such strategy can achieve the desired results greatly depends on customers' perception and usage of the delivered omnichannel service. In fact, omnishoppers are believed as the most valuable consumers for retailers [8,11], and attracting enough omnishoppers is also crucial to the success of omnichannel strategy [1]. Based on this reason, a theoretical investigation on omnichannel usage behavior from a customer viewpoint clearly deserves more attention.

Notably, a few studies have emphasized the necessity to explore customers' omnichannel usage behavior, but theory-driven empirical studies are still limited [10,12–14]. Some recent studies have tried to build on the well-established IS theories such as the technology acceptance model (TAM), the theory of reasoned action (TRA), and the extended unified theory of acceptance and use of technology (UTAUT2) to explain customer usage and purchasing behavior in the omnichannel context, by exploring the effects of perceived usefulness, ease of use, customer attitudes, and social influences [15–17]. Although these classic theories have strong theoretical explanatory powers in predicting usage

* Corresponding author.
*E-mail addresses:* xlshen@whu.edu.cn (X.-L. Shen), lyon@whu.edu.cn (Y.-J. Li), sunyq@whu.edu.cn (Y. Sun), nanwang@whu.edu.cn (N. Wang).

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behavior for a wide variety of contexts [18–20], it is important and necessary to understand the uniqueness of a specific context, beyond users' perceptions towards general information systems. In particular, the specificity of omnichannel business and the key differences between omnichannel and other primary channel strategies used by the retailers should be further considered to develop a deep understanding of customer omnichannel service usage behavior.

The closest concept to omnichannel discussed in the literature may be multichannel service. However, unlike multichannel management that focuses on the deployment and practice of multiple retailing channels, omnichannel emphasizes the synergetic management of all various parallel channels to achieve a more seamless, integrated and consistent customer cross-channel experience [2]. This view suggests that to what degree the focal technology can integrate individual channels determines the level of cross-channel experience of customers, which further affects their omnichannel usage behavior. In this sense, previous research has regarded cross-channel integration and the resulting fluency experience as the essential enablers of omnichannel business success [1,7,21]. Therefore, the integration quality of parallel channels and customers' perceived fluency of cross-channel service should be regarded as the core elements that distinguish omnichannel from multichannel services. With this point of view, it is necessary to develop a research model to capture the unique features of omnichannel, and build on cross-channel integration quality and perceived fluency experience to explore the key antecedents of omnichannel service usage.

To advance this line of research, we attempt to draw upon Wixom & Todd model [22], to understand how channel integration quality (i.e., object-based beliefs) and perceived fluency (i.e., behavioral beliefs) affect omnichannel service usage. Wixom & Todd model has been widely used to explain how people interact with a focal technology and how their perceptions towards using the technology affect their subsequent usage behavior [23–26]. This is also the case in our research, wherein omnichannel usage is related to not only the extent to which various channels are integrated (i.e., object-based beliefs), but also customers' perceptions about seamless channel transfers (i.e., behavioral beliefs). Furthermore, it is generally known in IS research that users' behavioral beliefs derived from actual usage might change with time as the users gain more experience [20,27–29], but Wixom & Todd model ignores such effect. This study thus presents an attempt to extend Wixom & Todd model by including usage experience as an individual behavior-based trait, and further examine its moderating effect on the link between behavioral beliefs and usage behavior. In addition, prior studies on the moderating role of usage experience often failed to distinguish between usage experience of a specific information technology (i.e., internal usage experience) and usage experience of other similar technologies (i.e., external usage experience), thus generating some conflicting findings in the literature [27,28,30]. In the omnichannel context, retailers often implement the omnichannel strategies on different competing platforms, a clear understanding of the effects of both internal and external usage experience thus may help guide their omnichannel strategies and further explain the conflicting findings about the role of usage experience in the existing literature.

This study has the following research contributions. First, unlike previous studies focusing on the firm-level perspective, this study explores omnichannel usage behavior from a customer viewpoint, and therefore enriches current research on omnichannel business. Second, this study draws upon Wixom & Todd model and captures the uniqueness of omnichannel service. Channel integration quality is modeled as the object-based belief, and perceived fluency is modeled as the behavioral belief in this study. The identification of contextual uniqueness also provides a basis for future omnichannel research. Third, this study models omnichannel usage experience as an individual behavior-based trait, and divides it into internal and external usage experience. The different moderating effects of internal and external usage experience will help interpret the controversial findings in the literature and clearly explain the boundary conditions under which perceived fluency works. From a practical perspective, research presented in this study also motivates omnichannel practitioners to look beyond multichannel strategy, and focus more on integrating and optimizing various different individual channels, with an attempt to make customer channel transfer more fluent. Omnichannel strategy implementation also should take customer omnichannel usage experience, both internal and external, into account.

In what follows, we provide a review of the related literature, and research model and the associated hypotheses are presented in the next section. Research design and the results of data analysis are discussed in the following two sections, respectively. Finally, we discuss the key findings, research limitations, and the implications for both research and practice.

## 2. Literature review and theoretical background

### 2.1. Omnichannel service usage

The concept of “omnichannel” evolved from multichannel, with a specific focus on the integration and coordination of detached channels to meet consumers' needs for seamless channel transitions [2]. Notably, the concept of omnichannel is rather new to both IS and marketing fields, wherein multichannel has been generally used as an umbrella term to describe channel strategies involving multiple channel practices [31]. Therefore, it is also necessary to distinguish between omnichannel and multichannel to capture the unique and fundamental features of omnichannel. Based on the previous studies, this study provides a literature review of the major differences between omnichannel and multichannel, as discussed in Table 1. It is easy to recognize that, different

**Table 1**
Differentiation of multichannel and omnichannel.
Source: Based on Mirsch et al. [31], Picot-Coupey et al. [77] and Juaneda-Ayensa et al. [16].

| | Multichannel | Omnichannel |
|---|---|---|
| Definition | A siloed approach that operates channels as independent entities. | A unified approach that manages channels as intermingled touch points to allow consumers to have a seamless experience within an ecosystem. |
| Channel characteristics | Coexistence of several channels, considered as separate and in competition. | Informational and transactional touch points are integrated within a unified channel to allow a seamless consumer experience. |
| Channel scope | Store, website, and mobile channel. | Store, website, mobile channel, social media, and all other customer touchpoints. |
| Channel integration | No switching between channels. | Seamless switching among all channels and touchpoints. |
| Channel management | Management of the channels and customer touchpoints geared towards optimizing the experience with each channel. | Synergetic management of the channels and customer touchpoints geared towards optimizing the holistic experience. |
| Data | Data are not shared across channels. | Data are shared across all channels. |
| Channel goals | Sales per channel, experience per channel. | All channels and touchpoints work together to offer a holistic customer experience. |
| Customer | Perceived interaction with the channel. | Perceived interaction with the brand. |
| | No possibility of triggering interaction. | Can trigger full interaction. |
| | Use channels in parallel. | Use channels simultaneously. |
| Retailers | No possibility of controlling integration of all channels. | Control full integration of all channels. |
| Sales people | Do not adapt selling behavior. | Adapt selling behavior using different arguments depending on each customer's needs and knowledge of the product. |

from multichannel, omnichannel involves not only the simultaneous use of multiple channels, but also the synergetic management of the parallel channels to make customers' cross-channel transition experience seamless and integrated. In this regard, channel integration and fluent cross-channel experience are believed at the heart of omnichannel business, which together fundamentally distinguish omnichannel service from the traditional multichannel service. As such, this study defines omnichannel service as a kind of service that allows customers freely choose among all parallel channels, and seamlessly switch among the different channels, without any information loss or reiteration.

Omnichannel has received considerable academic attention in the past few years since it was proposed, and a number of research efforts have been devoted to develop research agenda or framework to guide future research on this topic [1,6–8,32]. Some other studies have discussed and addressed the potential challenges and opportunities in the omnichannel practices [9,10]. Recently, some initial efforts have been undertaken to explain omnichannel customer behavior, as reviewed in Table 2. Obviously, most of the current research on omnichannel customer behavior concerns purchase or channel choice behavior [12,17,33], indicating that omnichannel service usage was rarely examined in the existing research. To understand how omnichannel service usage is formed, this study defines omnichannel service usage as the extent to which customers engage in omnichannel service (e.g., usage intensity and usage scope), and will empirically explore its key drivers and the boundary conditions.

### 2.2. Wixom & Todd model

Wixom & Todd [22] developed a research model to distinguish object-based beliefs from behavioral beliefs, and particularly underlined that the integration of the two beliefs was the essential principle for designing user-IT artifact interaction research model. Object-based belief is about technological features and functionalities, and behavioral belief represents how users evaluate the outcomes or experience of using the IT artifact [22]. Consistent with the human agency theory [34], Wixom & Todd [22] further indicated that object-based beliefs affected human behavior primarily through users' behavioral beliefs.

Wixom & Todd model has been extensively accepted by IS scholars as a conceptual framework to build their research model [23–26]. For example, Al-Natour & Benbasat [23] developed an interaction-centric model for user-artifact relationship research, and suggested that object-based beliefs affected behavior intention by shaping behavioral beliefs. Wang et al. [26] regarded the cognition-based and affect-based trust as two object-based beliefs, and indicated the two beliefs would consequently affect users' behavioral beliefs, such as usefulness and enjoyment. As mentioned above, channel integration quality and perceived fluency represent the major features of omnichannel business. In particular, channel integration quality is conceptualized as an object-based belief because it describes the ability of omnichannel technology to integrate various parallel channels and reflects customers' beliefs about the omnichannel technology itself [35]. Perceived fluency is labeled as a behavioral belief in this study because it refers to how customers evaluate their cross-channel experience arising from the actual usage behavior, and thus reflects customers' beliefs about using omnichannel technology [36]. Therefore, the logic underlined by Wixom & Todd model, and the object-based and behavior-based beliefs could address the characteristics of omnichannel (i.e., channel integration quality) on the one hand, and customers' perceptions towards using the omnichannel service (i.e., perceived fluency), on the other hand.

### 2.3. Channel integration quality

Channel integration quality is defined as the ability to provide customers with a seamless and unified service experience across different channels [35]. Previous studies demonstrated that channel integration quality could significantly explain customer cognition and behavior across multiple channels [37,38]. For example, Wu & Chang [38] found that channel integration quality enhanced customers' perceived value when shopping online. Saghiri et al. [1] also identified channel integration as one of the essential enablers of omnichannel business success, and argued that without a comprehensive integration of detached channels, multichannel business would never evolve into omnichannel business. As illustrated in Table 1, omnichannel service is distinguished from multichannel in several ways, and particularly, it emphasizes the synergetic management of all channels, instead of a simple combination of different channels [2]. As a result, we believe that channel integration quality is more oriented to address the concerns of omnichannel, rather than multichannel.

Sousa & Voss [35] have proposed a conceptual framework for channel integration quality, in which channel service configuration quality and integrated interaction quality were incorporated. Channel service configuration quality further includes channel choice breadth and

**Table 2**
Literature review on omnichannel customer behavior research.

| Author (year) | Theories | Key antecedents | Method | Outcomes |
|---|---|---|---|---|
| Berg & Tornblad [17] | TAM | Perceived ease of use; perceived usefulness; perceived security; perceived personalization; personal innovativeness; habit. | Online survey | Purchase intention within omnichannel |
| Chatterjee & Kumar [14] | – | Retailer channel strategy (omnichannel vs. pure-play online); product type (experiential vs. functional and durable vs. non-durable). | Secondary data | Willingness to pay more |
| Rodríguez-Torrico et al. [78] | – | Impulsiveness; need for touch. | Online survey | Mobile/online omnichannel frequency; frequency of channel use |
| Wetzlinger et al. [13] | – | Personalization; retailing context; privacy concerns. | Online survey | Intention to adopt |
| Yurova et al. [33] | – | Non-interactive adaptive selling; interactive adaptive selling; purchase control; initial purchase intention; product type (hedonic vs. utilitarian). | Online survey | Omnichannel consumer purchase intention |
| Park & Lee [12] | – | Gender; age; registration via mobile; total purchase; SMS subscription; push message subscription number; average purchase price, event purchase, average discount; coupon usage; product categories; purchase on the air. | Secondary data | Channel choice behavior in omnichannel |
| Luo et al. [10] | – | Enterprise IT applications; cross-channel capabilities; financial resources; firm size. | Secondary data | Action volume; action complexity; action heterogeneity |
| Jia [15] | Integrated information theory; TRA | Score of rating; volume of rating/reviews; attitude towards purchase via omnichannel retailers; brand attitude. | Experiment; online survey | Purchase intention after; post purchase intention |
| Juaneda-Ayensa et al. [16] | UTAUT2 | Effort expectancy; performance expectancy; social influence; habit; hedonic motivation; personal innovativeness; perceived security. | Online survey | Omnichannel consumer purchase intention |

channel service transparency. Channel choice breadth refers to the degree to which customers can freely access information and service from different channels for their needs satisfaction, which is often considered as an important cause for customer commitment and engagement [39,40]. Channel service transparency refers to the level of customer's familiarity with the attributes of all available channels, and it implies that customers are aware of the existence of all available channels and are familiar with their attributes. Integrated interaction quality represents the consistency of cross-channel interactions, and it includes two dimensions, i.e., process consistency and content consistency. Process consistency refers to consistency between relevant and comparable process attributes of different channels, and content consistency refers to consistency of information exchanged between different channels. As a result, both content and process consistency of interactions across different channels will produce a unified, reliable and consistent service experience for the customers.

### 2.4. Perceived fluency

The concept of fluency originates from information processing research, and refers to the ease of information processing [41]. Fluency is widely regarded as a key factor that shapes users' trust, positive affect, perceived cognitive effort, and ultimately, the choice outcome judgments in online shopping context [42–44]. Some studies further extended the concept of fluency to cross-platform service context, and argued that perceived fluency was associated with the continuity of cross-platform transitions and task migrations, thus acting as an important factor to measure cross-platform user experience [36,45,46]. With insights obtained from Majrashi & Hamilton [36], this study defines perceived fluency as the extent to which customers feel cross-channel experience natural, unhindered, and continuous.

Majrashi & Hamilton [36] further deconstructed perceived fluency into five dimensions, including task, content, interaction, cognition, and feeling fluency. Task fluency refers to the extent to which customers feel smooth when migrating tasks from one channel to another. Content fluency refers to the extent to which, after channel transition, customers experience the continuity of reading or exploring the service content and information. Interaction fluency refers to the extent to which the cross-channel service interactions are continuous and interconnected. Cognition fluency represents that customer's judgment about services remains unchanged after channel transition, while feeling fluency suggests that customers have a same level of feeling towards the services after channel transition. Generally speaking, the five dimensions of fluency cover the different but interrelated aspects of perceived fluency in the omnichannel service context, and thereby this study further conceptualizes perceived fluency as a second-order formative construct [47].

### 2.5. Two competing perspectives on IT use

There are two competing perspectives on IT use in the literature, i.e., conscious use and automatic use. Conscious use refers to a rational choice and behavior, which is driven by deliberate evaluation and analytical processing [48,49]. IT use thus is determined by thoughtful evaluations about using the technology, and this logic echoes some theories such as TAM and TPB, representing the prevailing view of IT use research [28]. Automatic use considers IT use as a routinized behavior, and it occurs spontaneously in a subconscious and unthinking way [49,50]. Automatic use is widely believed to result from user habit, i.e., the repetition of same behavior over time [49,50]. As a competing perspective to conscious use, automatic use will overshadow the role of conscious evaluation as a predictor of subsequent IT use, and it receives increasing attention in contemporary research [20,51–53].

Some prior studies tried to integrate the two IT use perspectives to investigate the role of the past IT use [28,49]. Jasperson et al. [49] believed that in the initial usage stage of an IT application, users tended to engage in conscious use since they had no usage experience bout the focal IT. With the repeated use of the IT, the usage behavior was more likely to be routinized, and thus automatic use would occur with little conscious effort. Kim et al. [28] argued that automatic use could result from an instant conscious evaluation. Two competing perspectives on automatic use, i.e., Habit/Automaticity Perspective and Instant Activation Perspective were proposed. Specifically, Habit/Automaticity Perspective suggests that automatic use results from habit without the need of IT evaluation, and as a result, user evaluations will exert weak effect on subsequent IT use when users have enough past usage experience to form a habit [28,51,54,55]. Instant Activation Perspective suggests that automatic use results from stabilized conscious evaluations, which are stored in memory and can be instantly activated when a similar event occurs [28]. In this sense, automatic use acts as an expedited form of conscious use, and past usage experience is believed to strengthen the effects of conscious evaluations on subsequent IT use [27,28,56].

## 3. Research model and hypotheses

This study develops a research model, as depicted in Fig. 1, to explore the determinants of omnichannel service usage. In line with the theoretical framework proposed by Wixom & Todd [22], channel integration quality, which is conceptualized as an object-based belief, is hypothesized to affect perceived fluency, which is conceptualized as a behavioral belief in this study. Perceived fluency further exerts a positive impact on omnichannel service usage. This study also examines the different moderating roles of internal and external omnichannel usage experience on the relationship between fluency and usage. Fig. 1 depicts the interrelationships among these major constructs.

### 3.1. Perceived fluency and omnichannel service usage

In the omnichannel service context, customers are increasingly expecting a seamless and unified service experience across different channels, in addition to the simultaneous use of multiple channels [2]. In this sense, if omnichannel service providers could offer the customers a seamless and smooth cross-channel experience, customers will be very likely to use the omnichannel services. Prior studies have also suggested that fluent online shopping experience would evoke positive affective responses, and facilitate positive online behavior [43,44]. Based on Wixom & Todd model, perceived fluency is regarded as a behavioral belief in this study, and it is believed that when customers perceive a fluent cross-channel experience, they will be more likely to increase their usage behavior of omnichannel service. Therefore, we propose that:

**$H_1$.** Perceived fluency is positively associated with omnichannel service usage.

### 3.2. Channel integration quality and perceived fluency

Wixom & Todd model demonstrated that users' evaluations about the technological features and functionalities of a focal technology would determine and shape users' perceptions about using the technology [22]. Following this logic, this study predicts that channel integration quality, which refers to an object-based belief and includes channel choice breadth, channel service transparency, content consistency, and process consistency, will influence customers' perceptions about using the omnichannel service, and in particular, a fluent usage experience for the omnichannel service in this study.

As for the effect of channel choice breadth, when channel choice breadth is wide enough, there will be more alternative channels for customers to access a given service, and customers thus will have more flexibility to accomplish tasks through the preferred channels [35,37]. In this regard, a broad range of channel choice available to the

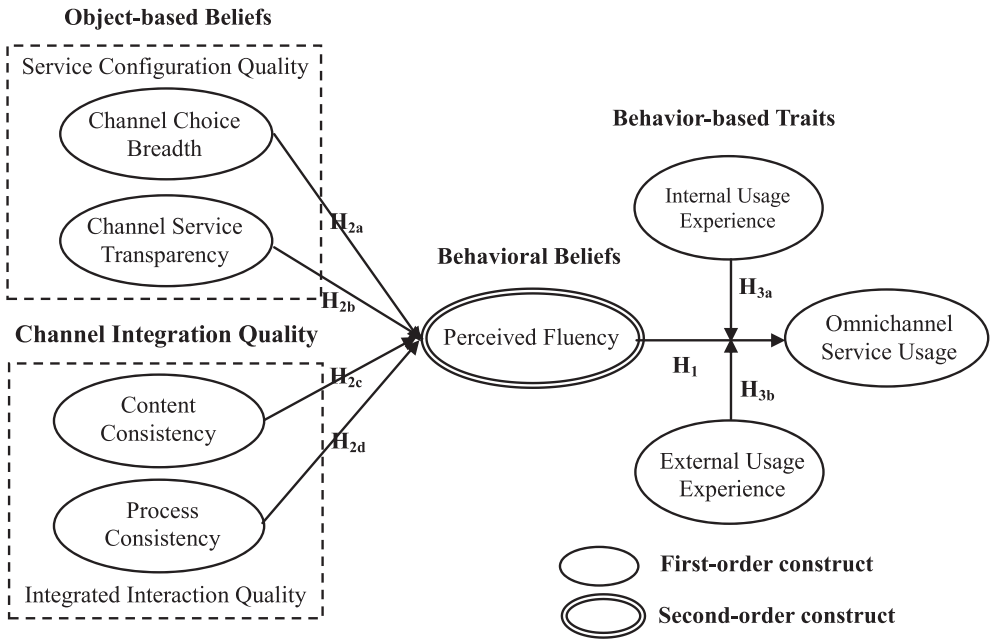


**Fig. 1.** Research model.

omnishoppers implies that channels are highly interconnected and integrated, because only in this way can customers freely choose channels to satisfy their specific needs [57]. As such, the breadth of channel choice will help ensure the continuity of channel transition in omnichannel service context. Prior research also confirmed that the channel choice breadth could significantly enhance shopping convenience and support the continuity of service and information, after channel transitions [37,58]. Thus, we have the following hypothesis:

**$H_{2a}$.** Channel choice breadth is positively associated with perceived fluency.

Channel service transparency describes customers' awareness of the existence of all available service channels, as well as their familiarity with service attributes of different channels [35,38]. In prior studies, it was believed that customers' familiarity with attributes of all available channels could reduce the uncertainty and enhance the efficiency of channel transition [38]. Some other studies further demonstrated that channel familiarity and uncertainty reduction would attenuate the amount of cognition effort associated with channel transitions, thus creating a fluent cross-channel experience [36,44]. Denis & Karsenty [59] also suggested that transparency would allow customers to immediately know what kind of services they could access and how exactly they could access the services through different channels. Based on these arguments, we believe that when channel service transparency is higher, customers will be more likely to effortlessly switch between channels and thus experience a fluent channel transition. Therefore, we have the following hypothesis:

**$H_{2b}$.** Channel service transparency is positively associated with perceived fluency.

Content consistency implies that customers can receive same responses through different channels [35]. According to group entitativity theory, similarity or consistency is often used as the criterion for group formation [60]. In this regard, the similarity of information presented across different channels will contribute to the integration of various different channels. As a result, customers are more likely to regard the channels as the subsidiaries of an integrated group wherein channel switch tends to be natural, unhindered, and effortless [38,60]. Moreover, previous research also suggested that the similarity of information in different channels would create a synergetic effect and support the continuity of services after channel transitions, thus resulting in a fluent channel transition [36,58]. Therefore, we have the following hypothesis:

**$H_{2c}$.** Content consistency is positively associated with perceived fluency.

Process consistency refers to the similarity and consistency of relevant and comparable process attributes (e.g. service's feeling, image, and performance) in different channels [35,61]. As discussed above, similarity or consistency is helpful for the formation of entitativity perception [38,60,62]. Therefore, process consistency also will lead to an unhindered and effortless channel transition. When service processes in different channels are consistent, customers' judgments and feelings about the service will remain unchanged after channel transition [35,57], thus providing customers a smooth cognition and feeling [36]. In this regard, we have the following hypothesis:

**$H_{2d}$.** Process consistency is positively associated with perceived fluency.

### *3.3. The different moderating roles of usage experience*

This study regards usage experience as an individual behavior-based trait and includes it as a moderator for the relationship between behavioral beliefs and usage behavior. In particular, this study divides omnichannel usage experience into internal and external usage experience, and hypothesizes that internal and external usage experience will play different moderating roles on the relationship between perceived fluency and omnichannel service usage.

Internal usage experience is defined as the extent to which users have experience about a specific IT (e.g., Dianping in this study). Previous research has demonstrated that past use of a specific IT would reinforce the habit of using the focal technology [50,51]. According to the Habit/Automaticity Perspective, habit will weaken the effects of evaluation on human behavior because with the increase of habit, people tend to use the focal technology automatically and rely less on conscious judgments and evaluations [28,51]. In the context of omnichannel

business, inexperienced omnichannel customers are unfamiliar with the omnichannel service, and accordingly, they are more inclined to rely on the evaluative beliefs derived from actual usage of omnichannel service (i.e., perceived fluency) to determine subsequent usage [55,63]. In contrast, for customers with rich experience of current specific omnichannel service, the repetition of past usage will motivate them to automatically use such service without a careful evaluation about the fluency of cross-channel service [28]. Based on the arguments above, we believe that perceived fluency (i.e., behavioral belief) will exert a stronger effect on omnichannel service usage for customers with less internal usage experience.

External usage experience is defined as the extent to which users have experience with other similar omnichannel services (e.g., Uniqlo, Zara, or other forms of omnichannel service). Unlike internal usage experience, prior usage experience about other similar technologies will not necessarily make users familiar with the focal technology. Instead, the external usage experience will provide users with a benchmark or reference level to better evaluate the specific technology [27,30,64]. Therefore, as external usage experience increases, users' evaluations about the focal technology can be more thorough and deliberate because users can get more knowledge from the use of similar technologies [27]. According to the Instant Activation Perspective, general evaluations about omnichannel service are stored in users' memory, which can be activated in a similar situation and can enhance the effects of conscious evaluations [27,28]. Based on the arguments above, we believe that customers with higher external usage experience tend to be more knowledgeable and well-informed about omnichannel service, and thus can better judge the fluency of a focal technology in integrating multiple channels. In other words, perceived fluency will exert a stronger effect on omnichannel service usage for customers with higher external usage experience. Therefore, we have the following hypotheses:

**$H_{3a}$.** Internal usage experience weakens the effect of perceived fluency on omnichannel service usage.

**$H_{3b}$.** External usage experience enhances the effect of perceived fluency on omnichannel service usage.

## 4. Methodology

### 4.1. Research setting

This study adopted an online survey method to collect the data to examine the research model. Dianping was selected as the research setting, which was initiated in 2003. Nowadays, Dianping has evolved into one of the largest local service platforms in Mainland China, with more than 200 million active users per month and 20 million retailers. In particular, different from the traditional information service, Dianping has provided a platform for the restaurants to implement their omnichannel strategies, and created a closed-loop dining experience for the customers. In this regard, customers can access different channels via Dianping and obtain an integrated cross-channel shopping experience. A brief description of the key features about Dianping on mobile device can be found in Fig. 2, and Table 3 presents some details involved in omnichannel dining service on Dianping. It can be seen that channels including telephone, online website, mobile device, social

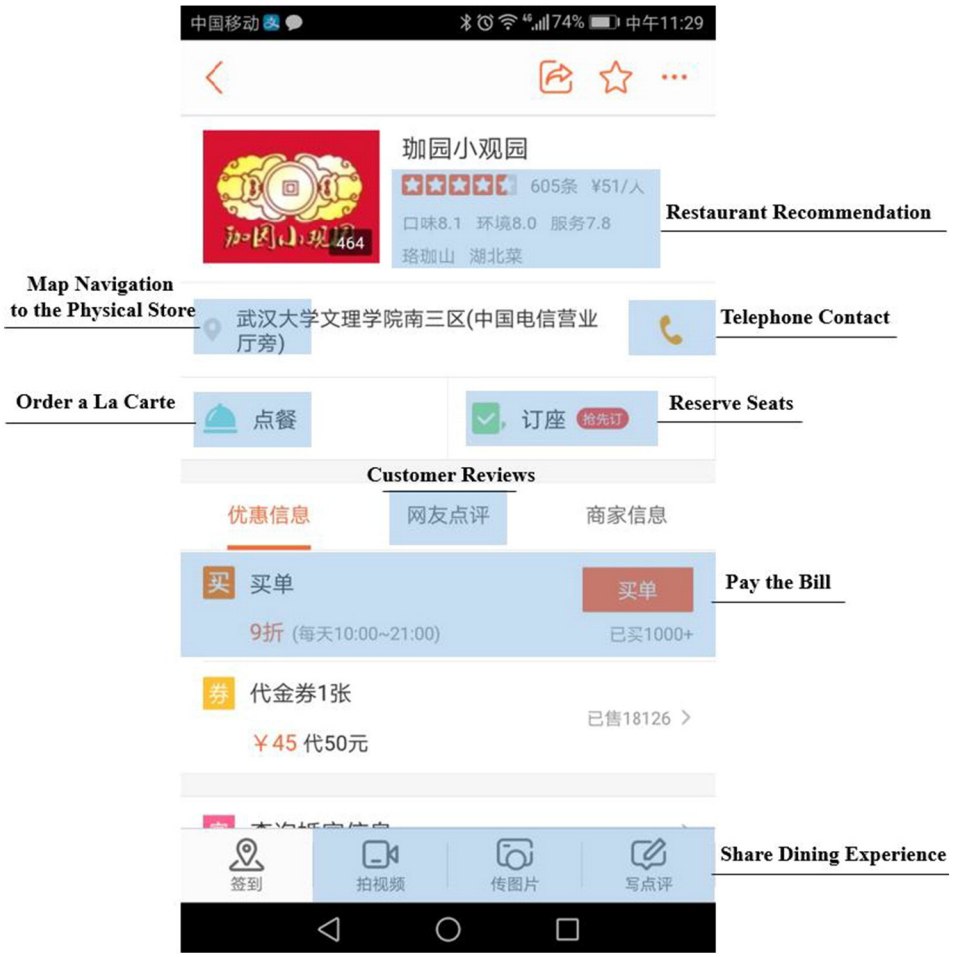


**Fig. 2.** A description of the key features about Dianping on mobile device.

**Table 3**
Descriptions of omnichannel dining service in Dianping.

| | |
|---|---|
| General introduction | Dianping provides a unified approach for the brick-and-mortar restaurants to integrate their online and offline service process. Customers can experience a seamless channel transition via Dianping, thus improving their dining experience. |
| Channel characteristics | The distinctions between physical and online channels are vanishing in Dianping, and customers can freely choose their preferred channels to access the needed services, including receiving restaurant recommendations, queuing and reserving seats, ordering a la carte, paying the bill, and sharing their dining experience. |
| Channel scope | Brick-and-mortar restaurant offers its users more alternative channels by using the Dianping platform. The channel scope includes telephone, online website, mobile device, social media, physical store and other customer touchpoints such as carryout service. |
| Channel integration | In Dianping, the above-mentioned channels are highly integrated, and customers can easily switch between different channels if required, without information loss or reiteration. For example, after dinner, people can pay the bill directly via the mobile phone, regardless of whether they order the service online or offline. |

media, and physical stores are provided to the customers by restaurants in Dianping, and therefore, customers can freely choose their preferred channels to access the needed services. Information and service processes across different channels are also seamlessly integrated and synergistically managed on Dianping to make customers cross-channel transition more fluent and much easier. An introduction to the omnichannel service offered by restaurants in Dianping has been presented at the beginning of the questionnaire, and the target population of this study are users who have accessed the omnichannel service.

### 4.2. Measurement

The measures of all constructs in this study were adapted from prior studies with slight modifications to fit the current research context. Specifically, channel service transparency and process consistency were measured with items adapted from Sousa & Voss [35] and Wu & Chang [38]. Channel choice breadth was measured with items adapted from Sousa & Voss [35] and Madaleno et al. [37]. Content consistency was measured with items adapted from Sousa & Voss [35]. Task, content, and interaction fluency were measured with items adapted from Majrashi & Hamilton [36] and Wäljas et al. [45]. Cognition fluency and feeling fluency were measured with items adapted from Majrashi & Hamilton [36]. Omnichannel service usage was measured with items adapted from Karahanna et al. [65]. Appendix A lists all constructs and measures. All items were phrased as seven-point Likert scales ranging from 1 (strongly disagree) to 7 (strongly agree). Internal and external usage experience were measured using the following item: "*Please indicate your overall experience with omnichannel service offered by restaurants in Dianping, and with omnichannel services offered in other platforms*" (from "1 = no experience at all" to "5 = very experienced").

### 4.3. Data collection

Before initiating the data collection, we first pretested the questionnaire with ten doctoral students majoring in business and management and asked them to comment on the readability and clarity of the questionnaire. Their suggestions concerning the format and wordings of the measures were incorporated in the revised questionnaire. We provided a brief introduction to the omnichannel service offered by restaurants in Dianping and the purpose of this study at the front of this questionnaire. In addition, two screening questions were also added to ensure that the respondents all had omnichannel service usage experience before. Data was collected using sample service of Sojump, which is the largest professional online survey website in China and has more than 2.6 million active members with diversified backgrounds. Sojump is responsible for inviting eligible respondents to take our survey and respondents who didn't use omnichannel service offered by restaurants in Dianping are automatically screened out by the two screening questions. Finally, a total of 401 valid responses were received. Table 4 reports their demographic characteristics.

### 4.4. Common method bias

Since the data was collected based on respondents' self-reported subjective perceptions, common method bias may compromise the credibility of the data analysis results. In this regard, this study performed the Harman's single-factor test, a widely used method, to assess common method bias [66]. Results indicated that no single factor could account for most of the variance, thus reducing the concerns about common method bias. Furthermore, following the procedure introduced by Liang et al. [67], this study included a new factor in the research model, and operated it as the common method factor, which was measured reflectively with all indicators of the original model. Results in Table 5 suggest that loadings on substantive factors are high and significant (average 0.827 and lowest 0.732), with 68.6% of the average substantively explained variance of the indicator. Loadings on the newly method factor are low enough and most of them are non-significant (average −0.001 and highest 0.101), and the average common method based variance is 0.3%. Taken together, the common method bias is not a problem to the findings of this study.

## 5. Data analysis and results

The structural equation model (SEM) technique was used to validate the proposed model. The analysis was conducted using the partial least squares (PLS) approach, which is extensively applied to examine the

**Table 4**
Demographic statistics (N = 401).

| Characteristics | Frequency | Percentage |
|---|---|---|
| Gender | | |
| Male | 207 | 51.62 |
| Female | 194 | 48.38 |
| Age | | |
| ≤30 | 152 | 37.91 |
| 31–35 | 126 | 31.42 |
| ≥36 | 123 | 30.67 |
| Education | | |
| ≤Junior college | 57 | 14.21 |
| Undergraduate | 295 | 73.57 |
| ≥Postgraduate | 49 | 12.22 |
| Monthly income (RMB) | | |
| <6000 | 132 | 32.92 |
| 6000–9999 | 187 | 46.63 |
| 10,000–14,999 | 63 | 15.71 |
| ≥15,000 | 19 | 4.74 |
| Usage frequency of omnichannel service in Dianping (times per month) | | |
| 1–2 | 105 | 26.18 |
| 3–5 | 174 | 43.39 |
| 6–9 | 88 | 21.95 |
| ≥10 | 34 | 8.48 |

**Table 5**
Common method bias analysis.

| Construct | Indicator | Substantive factor loading (R1) | $R1^2$ | Method factor loading (R2) | $R2^2$ |
|---|---|---|---|---|---|
| CCB | CCB1 | 0.844*** | 0.713 | 0.034 | 0.001 |
| | CCB2 | 0.778*** | 0.605 | −0.115* | 0.013 |
| | CCB3 | 0.787*** | 0.620 | 0.072 | 0.005 |
| CST | CST1 | 0.794*** | 0.630 | −0.005 | 0.000 |
| | CST2 | 0.738*** | 0.544 | 0.052 | 0.003 |
| | CST3 | 0.785*** | 0.616 | −0.045 | 0.002 |
| CC | CC1 | 0.786*** | 0.618 | 0.062 | 0.004 |
| | CC2 | 0.757*** | 0.573 | 0.013 | 0.000 |
| | CC3 | 0.732*** | 0.535 | −0.081 | 0.007 |
| PC | PC1 | 0.881*** | 0.776 | −0.017 | 0.000 |
| | PC2 | 0.883*** | 0.779 | 0.035 | 0.001 |
| | PC3 | 0.894*** | 0.800 | −0.018 | 0.000 |
| TF | TF1 | 0.856*** | 0.734 | −0.008 | 0.000 |
| | TF2 | 0.794*** | 0.630 | −0.019 | 0.000 |
| | TF3 | 0.846*** | 0.717 | 0.026 | 0.001 |
| CNF | CNF1 | 0.857*** | 0.734 | 0.044 | 0.002 |
| | CNF2 | 0.811*** | 0.658 | −0.046 | 0.002 |
| | CNF3 | 0.801*** | 0.641 | −0.001 | 0.000 |
| IF | IF1 | 0.862*** | 0.743 | 0.101** | 0.010 |
| | IF2 | 0.837*** | 0.700 | −0.109* | 0.012 |
| CGF | CGF1 | 0.856*** | 0.732 | 0.025 | 0.001 |
| | CGF2 | 0.861*** | 0.741 | −0.025 | 0.001 |
| FF | FF1 | 0.905*** | 0.819 | 0.012 | 0.000 |
| | FF2 | 0.901*** | 0.812 | −0.013 | 0.000 |
| OSU | OSU1 | 0.808*** | 0.653 | 0.044 | 0.002 |
| | OSU2 | 0.809*** | 0.654 | 0.037 | 0.001 |
| | OSU3 | 0.855*** | 0.731 | −0.078 | 0.006 |
| Average | | 0.827 | 0.686 | −0.001 | 0.003 |

Note: CCB = channel choice breadth; CST = channel service transparency; CC = content consistency; TF = task fluency; CNF = content fluency; IF = interaction fluency; CGF = cognition fluency; FF = feeling fluency; OSU = omnichannel service usage.

research model with formative constructs (e.g., perceived fluency) in IS research [68]. Specifically, measurement model was first assessed to ensure the appropriate reliability and validity of the constructs, and structural model was then examined to evaluate the theoretical explanatory power of the model and the significance levels of the hypothesized relationships.

### 5.1. Measurement model

Both reflective and formative constructs were incorporated in the research model, and the examination of their measurement model should follow different procedures [69,70]. Regarding reflective constructs, internal reliability, convergent validity, and discriminant validity are generally used to evaluate the reliability and validity of the constructs. Composite reliability (CR) and average variance extracted (AVE) are the two widely accepted indicators to assess internal reliability, and their values are recommended to be greater than 0.7 and 0.5, respectively [71]. Table 6 shows that the CR values range from 0.803 to 0.916, and AVE values range from 0.576 to 0.816, suggesting that reflective constructs have a good reliability. In addition, the variance inflation factor (VIF) values were calculated to assess the possible multicollinearity problems among constructs. The results indicate that the VIF values for all constructs are below the suggested criteria threshold of 10 and the more stringent threshold of 3, suggesting that multicollinearity is not a concern [72].

Both convergent and discriminant validity can be assessed by checking the item loadings of the constructs. Specifically, when item loadings on their theory-related construct are higher than 0.7, the convergent validity of the construct will be satisfied. When item loadings on the expected construct are greater than those on other constructs, the discriminant validity of the construct will be achieved. Results in Table 7 show that all the item loadings on the respective construct are sufficiently high and greater than those on the other constructs. Thus, all reflective constructs exhibit a good convergent and discriminant validity. Moreover, discriminant validity can be also assessed by comparing the correlation coefficients with other constructs and the square root of their AVE values [71]. Table 6 shows that the square root values of the AVE for each construct are all greater than their correlation coefficients with other constructs, suggesting that all reflective constructs are significantly different from each other.

We used the procedure proposed by Petter et al. [69] to assess the reliability and validity of formative construct, i.e., perceived fluency in this study. To evaluate the construct validity of the second-order formative construct, the weight values of its subconstructs were calculated. Table 8 shows all the weight values of subconstructs on their related second-order formative construct are positive and significant, suggesting a satisfactory construct validity for formative construct [69]. To evaluate the construct reliability, potential multicollinearity among the subconstructs was examined. VIF values in Table 8 range from 1.485 to 2.444, satisfying the threshold of 3.00 [72]. Thus, the formative construct in this study exhibits a good reliability and validity.

### 5.2. Structural model

Fig. 3 depicts the results of PLS analysis, including the estimated path coefficients, the associated t-value and the overall theoretical explanatory power of the model. As illustrated in Fig. 3, channel choice breadth, channel service transparency, content consistency, and process consistency have a positive and significant effect on perceived fluency, with path coefficients at 0.433 ($t = 10.080$), 0.185 ($t = 4.519$), 0.281 ($t = 6.623$), and 0.176 ($t = 4.935$), respectively. Thus, $H_{2a-2d}$ are supported. Perceived fluency has a significant impact on omnichannel service usage, with path coefficient at 0.741 ($t = 29.965$), supporting $H_1$. Overall, channel integration quality factors have explained a large proportion

**Table 6**
Construct reliability and validity (N = 401).

| | AVE | CR | Mean | Std. | CCB | CST | CC | PC | TF | CNF | IF | CGF | FF | OSU | IUE | EUE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CCB | 0.646 | 0.845 | 5.651 | 0.779 | **0.804** | | | | | | | | | | | |
| CST | 0.597 | 0.816 | 5.714 | 0.735 | 0.643 | **0.772** | | | | | | | | | | |
| CC | 0.576 | 0.803 | 5.431 | 0.759 | 0.642 | 0.573 | **0.759** | | | | | | | | | |
| PC | 0.785 | 0.916 | 5.147 | 1.106 | 0.293 | 0.288 | 0.567 | **0.886** | | | | | | | | |
| TF | 0.693 | 0.871 | 5.457 | 0.846 | 0.631 | 0.562 | 0.675 | 0.481 | **0.833** | | | | | | | |
| CNF | 0.678 | 0.863 | 5.608 | 0.788 | 0.734 | 0.642 | 0.663 | 0.375 | 0.658 | **0.823** | | | | | | |
| IF | 0.720 | 0.837 | 5.382 | 0.835 | 0.662 | 0.527 | 0.607 | 0.415 | 0.618 | 0.658 | **0.849** | | | | | |
| CGF | 0.737 | 0.848 | 5.517 | 0.819 | 0.662 | 0.601 | 0.681 | 0.448 | 0.647 | 0.675 | 0.614 | **0.858** | | | | |
| FF | 0.816 | 0.899 | 5.193 | 1.048 | 0.475 | 0.386 | 0.515 | 0.469 | 0.491 | 0.485 | 0.476 | 0.503 | **0.903** | | | |
| OSU | 0.679 | 0.864 | 5.549 | 0.795 | 0.593 | 0.576 | 0.568 | 0.296 | 0.584 | 0.691 | 0.622 | 0.580 | 0.507 | **0.824** | | |
| IUE | – | – | 4.135 | 0.649 | 0.358 | 0.385 | 0.371 | 0.174 | 0.401 | 0.426 | 0.331 | 0.320 | 0.263 | 0.394 | – | |
| EUE | – | – | 2.870 | 0.937 | 0.151 | 0.072 | 0.182 | 0.184 | 0.215 | 0.105 | 0.237 | 0.150 | 0.154 | 0.200 | 0.111 | – |

Note: CCB = channel choice breadth; CST = channel service transparency; CC = content consistency; PC = process consistency; TF = task fluency; CNF = content fluency; IF = interaction fluency; CGF = cognition fluency; FF = feeling fluency; OSU = omnichannel service usage; IUE = internal usage experience; EUE = external usage experience. Std. = standard deviation. The numbers in bold in the diagonal row are square roots of the AVE.

**Table 7**
Item cross-loadings (N = 401).

| | CCB | CST | CC | PC | TF | CNF | IF | CGF | FF | OSU |
|---|---|---|---|---|---|---|---|---|---|---|
| CCB1 | **0.845** | 0.576 | 0.588 | 0.246 | 0.559 | 0.620 | 0.552 | 0.575 | 0.412 | 0.499 |
| CCB2 | **0.770** | 0.543 | 0.470 | 0.121 | 0.439 | 0.578 | 0.494 | 0.484 | 0.326 | 0.447 |
| CCB3 | **0.793** | 0.444 | 0.533 | 0.343 | 0.526 | 0.575 | 0.574 | 0.537 | 0.407 | 0.485 |
| CST1 | 0.588 | **0.796** | 0.462 | 0.148 | 0.404 | 0.534 | 0.455 | 0.505 | 0.307 | 0.419 |
| CST2 | 0.410 | **0.744** | 0.476 | 0.303 | 0.471 | 0.473 | 0.406 | 0.443 | 0.304 | 0.446 |
| CST3 | 0.498 | **0.776** | 0.429 | 0.208 | 0.426 | 0.481 | 0.383 | 0.446 | 0.286 | 0.468 |
| CC1 | 0.589 | 0.522 | **0.790** | 0.346 | 0.510 | 0.573 | 0.501 | 0.579 | 0.380 | 0.484 |
| CC2 | 0.522 | 0.496 | **0.757** | 0.310 | 0.536 | 0.501 | 0.508 | 0.501 | 0.349 | 0.485 |
| CC3 | 0.386 | 0.315 | **0.727** | 0.594 | 0.497 | 0.449 | 0.408 | 0.480 | 0.435 | 0.347 |
| PC1 | 0.234 | 0.230 | 0.464 | **0.882** | 0.419 | 0.311 | 0.393 | 0.385 | 0.445 | 0.240 |
| PC2 | 0.294 | 0.281 | 0.495 | **0.885** | 0.448 | 0.364 | 0.343 | 0.412 | 0.431 | 0.280 |
| PC3 | 0.268 | 0.239 | 0.482 | **0.890** | 0.411 | 0.324 | 0.369 | 0.393 | 0.379 | 0.269 |
| TF1 | 0.555 | 0.497 | 0.573 | 0.368 | **0.858** | 0.554 | 0.558 | 0.533 | 0.409 | 0.521 |
| TF2 | 0.512 | 0.430 | 0.523 | 0.355 | **0.790** | 0.536 | 0.449 | 0.540 | 0.402 | 0.453 |
| TF3 | 0.520 | 0.472 | 0.594 | 0.476 | **0.848** | 0.558 | 0.541 | 0.543 | 0.415 | 0.486 |
| CNF1 | 0.652 | 0.532 | 0.566 | 0.324 | 0.585 | **0.857** | 0.616 | 0.594 | 0.446 | 0.588 |
| CNF2 | 0.586 | 0.518 | 0.547 | 0.286 | 0.506 | **0.810** | 0.527 | 0.538 | 0.386 | 0.560 |
| CNF3 | 0.576 | 0.540 | 0.547 | 0.319 | 0.536 | **0.802** | 0.503 | 0.536 | 0.365 | 0.557 |
| IF1 | 0.626 | 0.515 | 0.584 | 0.361 | 0.547 | 0.616 | **0.878** | 0.570 | 0.394 | 0.574 |
| IF2 | 0.509 | 0.389 | 0.468 | 0.345 | 0.508 | 0.512 | **0.819** | 0.478 | 0.414 | 0.490 |
| CGF1 | 0.572 | 0.511 | 0.587 | 0.414 | 0.563 | 0.562 | 0.576 | **0.852** | 0.482 | 0.463 |
| CGF2 | 0.568 | 0.523 | 0.593 | 0.356 | 0.546 | 0.598 | 0.491 | **0.865** | 0.380 | 0.529 |
| FF1 | 0.430 | 0.369 | 0.466 | 0.470 | 0.447 | 0.432 | 0.433 | 0.439 | **0.910** | 0.467 |
| FF2 | 0.433 | 0.330 | 0.454 | 0.382 | 0.438 | 0.446 | 0.423 | 0.467 | **0.896** | 0.450 |
| OSU1 | 0.469 | 0.513 | 0.494 | 0.233 | 0.477 | 0.595 | 0.482 | 0.531 | 0.396 | **0.811** |
| OSU2 | 0.520 | 0.430 | 0.495 | 0.278 | 0.489 | 0.551 | 0.554 | 0.426 | 0.439 | **0.812** |
| OSU3 | 0.480 | 0.476 | 0.447 | 0.223 | 0.480 | 0.560 | 0.519 | 0.472 | 0.420 | **0.849** |

Note: CCB = channel choice breadth; CST = channel service transparency; CC = content consistency; PC = process consistency; TF = task fluency; CNF = content fluency; IF = interaction fluency; CGF = cognition fluency; FF = feeling fluency; OSU = omnichannel service usage. Bold numbers indicate item loadings on the assigned constructs.

of the variance (77.6%) in perceived fluency, which in turn explains 55% of the variance in omnichannel service usage.

A hierarchical multiple regression analysis was performed to examine the moderating effects of internal and external usage experience, and data was standardized to reduce potential multicollinearity. In particular, we performed a one-tailed *t*-test to evaluate the significance levels of the moderating effects, and this conduct has also been widely used in IS domain [73–76]. As shown in Table 9, the first model includes some demographic variables (gender, age, and education), the independent variable (perceived fluency), and two moderators (internal and external usage experience). Results indicate that perceived fluency ($\beta = 0.681$; $t = 17.657$) and internal usage experience ($\beta = 0.093$; $t = 2.465$) positively affect omnichannel service usage. The second model considers the interaction effects of perceived fluency and two moderators. Results show that the interaction effect of the perceived fluency and internal usage experience is negative and significant ($\beta = -0.059$; $t = -1.671$), whereas the interaction effect of the perceived fluency and external usage experience is positive and significant ($\beta = 0.059$; $t = 1.661$). Therefore, $H_{3a}$ and $H_{3b}$ are supported.

## 6. Discussion and conclusion

Based on the Wixom & Todd model, this study proposes a research model, where channel integration quality is identified as an object-based belief, and perceived fluency is labeled as a behavioral belief, to address unique and fundamental concerns of omnichannel service and to investigate the potential drivers of customer omnichannel service usage. In particular, according to the integration quality framework [35], channel integration quality includes two dimensions and four variables, i.e., channel choice breadth, channel service transparency, content consistency, and process consistency. Moreover, perceived fluency is conceptualized as a second-order formative construct including task, content, interaction, cognition, and feeling fluency, with insights obtained from cross-platform experience research [36]. Empirical results demonstrate that perceived fluency exerts a statistically significant and positive effect on omnichannel service usage, with more than half (55%) of the explained variance in omnichannel service usage. It clearly illustrates the importance of perceived fluency, which is often neglected in understanding omnichannel customer behavior in prior studies (e.g., [16]). The concept of fluency underlines customers' general perception towards the accessibility and easiness of cross-channel transitions, which is consistent with the purpose of omnichannel business. Following this line of reasoning, when customers perceive a fluent cross-channel experience in omnichannel service, they will have a positive attitude and perceive reduced efforts for the channel transition, and thus will be more likely to further access and explore the omnichannel services. As such, this study enriches the existing understanding of omnichannel customer behavior by highlighting the role of cross-channel transition.

Apart from perceived fluency, cross-channel transition is also reflected in omnichannel technology attributes in this study. Results indicate that channel integration quality four factors together explain a very large proportion (77.6%) of the variance in perceived fluency, and all dimensions positively and significantly affect the perceived fluency. Although the concept of channel integration quality was originally developed in the conceptual framework proposed by Sousa and Voss in 2006, channel integration quality is more relevant to omnichannel, which is designed to deliver a cross-channel, seamless, integrated and uniform service. Built on previous work, this study further presents a comprehensive discussion on channel integration quality by addressing some key issues around this topic, including its conceptual definition, measurement, and potential outcomes. In this sense, this study also paves the way for future empirical research into omnichannel technology quality.

Another interesting and important finding is the opposite moderating roles of internal and external usage experience. That is, internal usage experience (prior experience about the focal technology) weakens the effect of perceived fluency on omnichannel service usage, whereas external usage experience (prior experience about other similar technologies) enhances such effect. These findings confirm the two competing perspectives on the moderating effect of past usage experience [28]. Habit/Automaticity Perspective indicates users' automatic behavior results from their repeated use, and when internal usage experience increases, the path between behavioral beliefs and usage intention will be undermined to a point where internal usage experience overshadows behavioral beliefs as the determinant of usage intention. Instant Activation Perspective points out that the usage experience with other similar technology, (i.e., external usage experience) will help users develop general judgment towards omnichannel, and such judgment can be "instantly activated" to guide subsequent usage to a specific technology. In other words, the more the external usage experience, the more probably people will perform conscious processing.

**Table 8**
Reliability and validity of perceived fluency.

| Subconstructs | Weights | *t*-Values | VIF values |
|---|---|---|---|
| Task fluency | 0.197 | 3.810 | 2.209 |
| Content fluency | 0.415 | 8.140 | 2.444 |
| Interaction fluency | 0.232 | 5.340 | 2.102 |
| Cognition fluency | 0.203 | 4.413 | 2.283 |
| Feeling fluency | 0.154 | 4.839 | 1.485 |

### 6.1. Theoretical implications

Theoretical contributions of this study can be understood in the following three ways. First, this study seeks to explore an emerging phenomenon of omnichannel business from a customer usage behavior perspective. Recently, we have witnessed a remarkable shift from multichannel to omnichannel service, and at the same time, omnichannel service is attracting increasing interests from scholars in both marketing

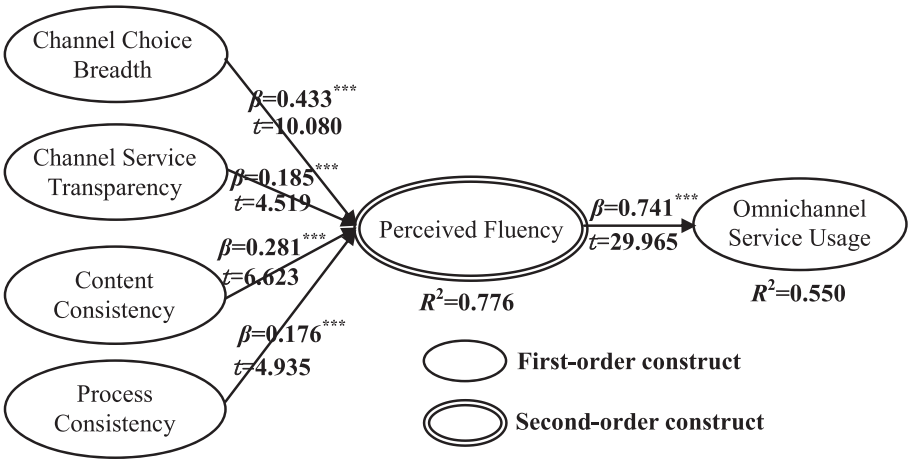


**Fig. 3.** PLS results (N = 401).

and IS disciplines. In the face of this emerging field, previous studies primarily examined this issue from a qualitative point of view, for example providing research agenda and framework to guide future research, or at a firm-level analysis, such as addressing the challenges and opportunities for omnichannel retailers. It is important to notice that, customer is the ultimate goal of any business, and especially omnichannel strategy aims to reach and target customers from different channels. From this point, a theory-driven empirical research on customer omnichannel usage will thus provide a timely and informative exploration of this emerging phenomenon, generate a more holistic picture of the omnichannel business from a customer viewpoint, and further deepen our understanding of how customers interact with the omnichannel technology.

Second, this study introduces two new constructs to IS research, i.e., channel integration quality and perceived fluency, and more importantly, these two new constructs meet the unique and major concerns in omnichannel business. This study also addresses the key issues involved in the two constructs, including conceptual definition, measurement, and the potential outcomes, offering a basis for future research on this topic. Different from prior studies that examined omnichannel usage without carefully considering the specificity of the context, we believe that a keen awareness of the omnichannel context will enable a more in-depth investigation on this issue. Furthermore, this study theoretically frames channel integration quality and perceived fluency using Wixom & Todd model, thus extending object-based beliefs and behavioral beliefs in the omnichannel context. Wixom & Todd model is used as a powerful framework to explore technology attributes and behavioral beliefs of technology usage, it is thus suggested that future research can build on this framework and the specific antecedents identified in this study to further explore the potential drivers of omnichannel customer behavior.

Third, this study differentiates internal usage experience from external usage experience, and thus sheds new insights into how technology usage experience works. On the one hand, the results revealed the opposite moderating effects of internal and external usage experience, confirming the effectiveness of two competing perspectives, i.e., Habit/Automaticity Perspective and Instant Activation Perspective, in understanding the role of past usage experience. In this regard, this study provides a possible explanation for the conflicting findings regarding the moderating effects of usage experience in the literature. On the other hand, this study also extends Wixom & Todd model with taking individual behavior-based traits as the moderating variables between behavioral beliefs and usage behavior, thus better enriching the theoretical framework and providing a guide for future research to further explore the role of different individual behavior-based traits in moderating the effect of behavioral beliefs.

**Table 9**
Summary of regression results (N = 401).

| | Model 1 | | Model 2 | |
|---|---|---|---|---|
| | β | *t*-Values | β | *t*-Values |
| Gender | −0.011 | −0.301 | −0.008 | −0.240 |
| Age | −0.041 | −1.178 | −0.041 | −1.186 |
| Education | 0.030 | 0.874 | 0.029 | 0.848 |
| IUE | 0.093** | 2.465 | 0.096** | 2.552 |
| EUE | 0.043 | 1.246 | 0.031 | 0.878 |
| PF | 0.681*** | 17.657 | 0.673*** | 17.295 |
| PF * IUE | | | −0.059* | −1.671 |
| PF * EUE | | | 0.059* | 1.661 |
| $R^2$ | 0.546 | | 0.552 | |
| Δ*F* | | | 2.330* | |

Note: PF = perceived fluency; IUE = internal usage experience; EUE = external usage experience. One-tailed *t*-tests were performed to evaluate the significance.
* $p < 0.05$.
** $p < 0.01$.
*** $p < 0.001$.

### 6.2. Practical implications

This study also provides several suggestions for omnichannel service providers. First, this study indicates that perceived fluency acts as the key determinant of omnichannel service usage, with the large proportion of the explained variance. It is thus expected that omnichannel service providers should optimize their channel management to create a fluent cross-channel service experience for the customers. In particular, this view is different from the traditional multi-channel strategies that concern more about helping customers to complete transaction and service using different channels. In order to achieve a fluent cross-channel service experience, this study further suggests that channel integration quality, i.e., channel service transparency, channel choice breadth, content consistency and process consistency, should arouse sufficient attention from the practitioners. In this regard, omnichannel service providers should provide more available channels for the customers to access a specific service, and help customers understand how to use and integrate different channels to achieve their consumption needs. For example, service providers can design some game tasks to familiarize the customers with switch between different channels. Consistency during channel transition is also highly important for the evaluation of channel integration quality. Service providers should ensure that

information provided in different channels is consistent, and service process across different channels is seamless. A timely bug feedback mechanism thus should be established by the service providers to avoid inconsistence in information and service process. Another important implication for the omnichannel service providers is that individuals with different behavior-based traits will respond differently to the omnichannel strategies. In this study, internal and external usage experience were found to have different moderating effects on the relationship between perceived fluency and customers' omnichannel service usage. In this regard, omnichannel service providers should consider employing different strategies to attract individuals with different behavioral traits.

### 6.3. Limitations and future research

Although this study has yielded several interesting and original findings, limitations of this study also should be noted. First of all, this study was conducted in Mainland China, and particularly focused on omnichannel services in the catering industry. In this sense, generalizing the findings of this study to other cultures and industries should be made with caution, and cross-sectional studies using data collected from different countries are highly recommended. Second, although perceived fluency has explained a large proportion of the variance in omnichannel service usage, several other important factors such as perceived usefulness have not been included in the research model. We suggest future research to advance this line of research and to explore this issue further. Third, the data was collected using the survey method at one point in time. Although multicollinearity and common method bias are demonstrated to be not a problem, we still suggest future research using mixed-methods and longitudinal design to better examine the causal relationships described in this study. In particular, mixed-methods research including both quantitative and qualitative research is strongly encouraged, and a combination of subjective and objective data, such as archival data or even brain activity data, will make the results more robust and deepen our theoretical understanding of the omnichannel business.

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## Appendix A

The respondents were asked to answer the following questions based on their own usage experience with omnichannel service offered by restaurants in Dianping.

*Channel service transparency [35,38]*

CST1: I am aware of the existence of all available service channels.
CST2: I am aware of the differences between service attributes across different channels.
CST3: I know how to utilize different channels to meet my consumption needs.

*Channel choice breadth [35,37]*

CCB1: I can choose alternative channels for a given service.
CCB2: I can accomplish preferred tasks through individual channels.
CCB3: Regardless of the channel I choose, I can use other channels to get information or help.

*Content consistency [35]*

CC1: I receive the same response through different channels.
CC2: When I interact with one channel, my interactions with other channels are always taken into account.
CC3: The information is consistent across different channels.

*Process consistency [35,38]*

PC1: The service feelings are consistent across different channels.
PC2: The service images are consistent across different channels.
PC3: The service performance is consistent across different channels.

*Task fluency [36,45]*

TF1: I can migrate the tasks smoothly across different channels.
TF2: I can carry on the tasks smoothly from one channel to another.
TF3: Omnichannel service allows for fluently continuing on the task across different channels.

*Content fluency [36,45]*

CNF1: Omnichannel service supports my continuity of reading the service contents after my channels transition.
CNF2: Omnichannel service supports my continuity of exploring the service contents after my channels transition.
CNF3: After switching from one channel to another, I can easily find the recent read contents.

*Interaction fluency [36,45]*

IF1: My interactions with the service across different channels are continuous and interconnected.
IF2: There is no need for me to explicitly think about the channels when I am interacting with the service.

*Cognition fluency [36]*

CGF1: After channels transition, my engagement with the service remains the same.
CGF2: After channels transition, I can deal with the service correctly.

*Feeling fluency [36]*

FF1: After channels transition, I have the same level of feeling towards the service.
FF2: After channels transition, I like the service as well in comparison to the previous channel.

*Omnichannel service usage [65]*

OSU1: I frequently access the omnichannel service.
OSU2: I have used most available channels when dealing with the omnichannel service.
OSU3: Most of my interactions with the service are promoted through the omnichannel.

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**Xiao-Liang Shen** is a Professor of the Economics and Management School at Wuhan University. His current research interests include IT innovation adoption and diffusion, knowledge management, social media and e-commerce. He has published in several academic journals and conferences including Decision Support Systems, Journal of Information Technology, Journal of the Association for Information Science and Technology, etc.

**Yang-Jun Li** is a graduate student of Economics and Management School, Wuhan University. His research interests include social media and virtual community. His work has appeared in several international journals and conferences such as Journal of Business Research, Industrial Management & Data Systems, and Hawaii International Conference on System Sciences.

**Yongqiang Sun** is a Professor of the School of Information Management, Wuhan University. His current research interests include e-commerce, knowledge management, virtual community, and human-computer interactions. His research has appeared in journals such as Information Systems Research, Journal of the Association for Information Systems, Decision Support Systems, Information & Management, etc.

**Nan Wang** is an Associate Professor of the School of Information Management, Wuhan University. Her research interests include e-commerce, knowledge management, and virtual community. Her work has appeared in several international journals and conferences, including Decision Support Systems, International Journal of Information Management, among others.