

# CAPTURING OMNICHANNEL CUSTOMER EXPERIENCE: SCALE DEVELOPMENT AND VALIDATION THROUGH TWO LARGE-SCALE SURVEYS

## Abstract

The retail landscape is increasingly defined by hybrid, non-linear consumer journeys across online and offline channels. This leads to a new connected omnichannel consumer who now evolve in the new retail 4.0. In response to these two new phenomena, this study introduces Perceived Omnichannel Density (POD), a multidimensional construct capturing consumers' perceptions of touchpoint omnipresence, seamless, coherent, personalized and connected omnichannel experiences. POD comprises five dimensions: omnipresence, reciprocity, similarity of experience, personalization, and hybridization. Developed through literature review, expert validation, and three surveys across North America (n=381) and the United Kingdom (n=309), the scale demonstrates strong reliability, validity, and predictive power for perceived value, trust, satisfaction, and patronage intention. POD provides both a theoretical framework for understanding consumer-centric omnichannel experiences and a practical tool for optimizing retail strategies.

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## Keywords

Omnichannel Distribution, Omnichannel experience, scale development,

## Introduction

The retail industry is experiencing a fundamental transformation driven by mobile technologies, constant connectivity, and social media (Verhoef *et al.*, 2015). These forces have reshaped consumer behaviors, replacing linear decision-making with a dynamic and fragmented journey across multiple simultaneous touchpoints (Huré *et al.*, 2017; Paché *et al.*, 2014). Practices such as showrooming and webrooming exemplify this shift, where consumers alternate seamlessly between online and offline environments (Kang, 2018). In response, the concept of omnichannel retailing emerged, extending multichannel approaches by placing consumers at the centre of an integrated ecosystem (Lazaris et Vrechopoulos, 2014; Rigby, 2011).

Despite its relevance, omnichannel research lacks a validated measure of how consumers perceive omnichannel experiences in the retail 4.0. Existing scales focused narrowly on integration or similarity of experience, overlooking dimensions such as omnipresence, personalization, and hybridization cited in conceptual literature. This communication addresses that gap by introducing and validating the construct of Perceived Omnichannel Density (POD), defined as the level of consumer perception of their ability to interact freely with the retailer, where they want, when they want, and through an unlimited number of integrated touchpoints, while enjoying a personalized, contextualized, consistent, and seamless experience. POD incorporates five interrelated dimensions, as omnipresence, reciprocity, similarity of experience, personalization, and hybridization, aims to capture the multidimensional richness of connected commerce 4.0.

## Literature Review

Research has evolved in three major phases (Verhoef *et al.*, 2015). The multichannel era emphasized expanding consumer access to both physical and digital channels, but with little integration (Avery *et al.*, 2012). The integrated multichannel stage introduced partial harmonization in pricing, branding, and service quality. Finally, the omnichannel paradigm emerged, redefining the retailer's role as orchestrating a seamless consumer journey across all touchpoints at every consumption stages (Verhoef *et al.*, 2015; Zhang *et al.*, 2018).

The omnichannel experience has become central to retailing research, with scholars emphasizing consumer-centric frameworks that privilege coherence, ubiquity, and personalization (Leva et Ziliani, 2018). Yet, as seen in table 1, measurement tools have lagged retail field and conceptual literature. The literature proposes various approaches to measuring omnichannel integration, ranging from simple constructs to multidimensional models. Early unidimensional scales (Burke, 2002; Chiu *et al.*, 2011) assess the ability to use multiple channels and the fluidity of transitions but remain limited to cover the phenomena. Other studies introduce the concept of harmonization (Van Baal, 2014), focused on price and product consistency across channels, or cross-channel integration (Lee et Kim, 2010), which measures information consistency, freedom of choice, and reciprocity.

Multidimensional approaches enhance understanding by incorporating notions of synergy, complementarity, coordination, and reciprocity (e.g. Frassetto et Miquel, 2017; Wagner *et al.*, 2013). These scales evaluate content consistency, journey flexibility, and the ability to combine channel strengths. More recently, constructs such as integration quality (Shen *et al.*, 2018) and perceived omnichannel capability (Ürgüplü et Yumurtacı Hüseyinoğlu, 2021) include transparency, personalization, and the use of social media. Recent efforts (e.g. Rahmam *et al.*, 2022; Shi *et al.*, 2020a) expanded the scope adding dimensions as connectivity, flexibility, personalization, delivery, product return and social communications but first treated dimensions independently without second order level or second conflated practices going beyond the scope of the concept.

*Insert table 1 here*

The limitations of existing measures can be summarized as follows: (1) a narrow focus on integration and similarity while neglecting personalization, ubiquity, and hybridization; (2) lack of multidimensionality, as new measures (e.g. Shi *et al.*, 2020a) who conceptualize omnichannel experience as distinct constructs; and (3) few measures entered the era of retail 4.0 adding automation and AI as technological capacity. To overcome these issues, the research objective of

this research is to propose a new POD as a multidimensional, second-order construct that integrates functional and experiential dimensions into a coherent framework of the omnichannel retailing 4.0.

### **Model and measures**

In order to establish the nomological validity of the newly developed Perceived Omnichannel Density (POD) scale, the three surveys incorporated constructs widely recognized in omnichannel research as omnichannel perceived value, trust in retailer, satisfaction, and behavioral intention. These variables are theoretically linked to omnichannel performance and have been shown as positive consequences (Frasquet et Miquel, 2017; Huré *et al.*, 2017; Kim et Lee, 2014; Rahmam *et al.*, 2022; Schramm-Klein *et al.*, 2011; Shi *et al.*, 2020b). Perceived value was measured using an adapted multidimensional scale capturing experiential, monetary, social, and service-related benefits of integrated channels (Kim et Lee, 2014). Trust was assessed through a simplified four-item scale reflecting confidence in the retailer's reliability and integrity (Frasquet et Miquel, 2017). Satisfaction was measured using a three-item Likert scale evaluating overall fulfillment and proximity to an ideal experience (Wagner *et al.*, 2013). Finally, behavioral intention was captured through a six-item scale assessing purchase likelihood, repeat patronage, and positive word-of-mouth (Zeithaml, 1988). These latter scales are also of the Likert type, consisting of 7 points ranging from 'strongly disagree' to 'strongly agree' and they provide a robust framework for testing the predictive validity of POD within the stimulus–organism–response (SOR) model.

### **Methodology**

The research design followed a multi-stage, mixed-methods approach consistent with scale development best practices (Churchill Jr, 1979; DeVellis, 2016; Netemeyer *et al.*, 2003). Four main phases structured the process including conceptualization and items generation, content validity and items reduction, pilot study and two validation studies. Conceptualization of the measure and items generation has been realized by a systematic scientific and gray literature review and 10 qualitative interviews with retail managers across North America to form the initial items pool. The sampling method for the focus groups was judgment-based, given the exploratory nature of this phase, with sample size determined by theoretical saturation. Participants were deliberately selected to ensure diversity, including highly active and less active Quebec retailers in omnichannel distribution. Selection criteria aimed to capture perspectives from retailers of varying scales (local, regional, and national/international) and across different sectors. Table 2 summarizes the ten sessions conducted: three sectoral actors from Quebec's retail industry, two providers of online sales solutions, one offering standardized tools for smaller retailers and the other focused on strategic development of digital distribution, and five marketing or digital marketing managers from retailers ranging from small family businesses to large international firms across five distinct sectors. The discussions focused on the touchpoints used, omnichannel practices, the implementation of such strategies, as well as the challenges and opportunities that arise from them. At the end, five omnichannel dimensions were identified and eighty-two items were drafted to reflect the five dimensions of POD.

*Insert table 2 here*

Next, content validity was demonstrated by a Delphi study with 9 academic experts refined the pool to 54 items through relevance and dimension classification of the new measure. As seen in table 3, the evaluation involved nine marketing professors, from a list of 95 professors, specializing in retail and, digital distribution. Two judges had also prior experience in scale development. We

sent two follow-ups to unit sample and when they accepted, we sent form whit instruction, definitions, scale and questions. During the assessment, the definition of perceived omnichannel density (POD) and its dimensions were presented alongside a randomized list of items. Open-ended questions addressed item representativeness within dimensions and the conceptual logic of the scale (DeVellis, 2016; Netemeyer *et al.*, 1991). Panel members rated item relevance using a three-point Likert scale (“not necessary,” “useful but not essential,” “essential”) to calculate the Content Validity Ratio (CVR). They also classified items into dimensions (omnipresence, reciprocity, experience similarity, hybridization, personalization) to compute agreement indices and validate structural logic. Given the reflective and formative nature of the scale and the novelty of the phenomenon, the authors employed an expert panel (n = 9) consisting of university researchers with publications on omnichannel topics. The sample was purposive, convenience-based, and non-probabilistic, recruited via email list constructed throw the literature review. Upon acceptance, participants received a form containing construct definitions and two evaluation tables: one for rating item importance and another for assigning items to dimensions, along with space for qualitative comments. Based on a Content Validity Ratio (CVR) threshold of 0.52 and a Proportional Standard Agreement (PSA) threshold of 0.60, 12 items were removed, resulting in a final set of 34 items from the original 46.

With items retained an exploratory factor Analysis (EFA) was realized by a pilot study with 114 North American omnichannel consumers. Given the multidimensional and reflective–formative nature of the scale, a pilot survey was conducted with US respondents recruited from Amazon Mechanical Turk’s master panel. The objective was to test the initial structure of the scale, assess item performance, and evaluate preliminary reliability of an English scale. An on-line survey panel was appropriate as we did not ask for external validity or a precise consumption context. Participants first confirmed a recent omnichannel purchase and described the experience in an open-ended question to ensure validity and categorization. The questionnaire included the new perceived omnichannel density scale, dependent variables (e.g., perceived system value, trust, satisfaction, patronage intention), moderators, and control variables, all adapted from prior literature. Data collection occurred between June 13 and 24, 2022, yielding 412 responses; after applying strict quality checks and exclusion criteria (e.g., filter questions, response time), 114 valid cases remained. Although MTurk offers cost-effective, diverse samples, issues such as automated responses and reduced researcher control required rigorous screening to maintain internal validity. Sample profile is presented in the appendix. This phase confirmed a five-factors solution, reducing the scale to 20 items with strong reliability ( $\alpha = 0.87$ ) ready for the two main validation survey.

*Insert table 3 here*

Finally, confirmatory factor analysis (CFA) has been realized by a suit of two validation correlational surveys of North American omnichannel consumers contacted by online survey platform Amazon M-Turk for validation survey (n=381) and UK omnichannel customer contacted by Prolific (n=309) for revalidation survey. The rational to use online panel are the same than for pilot study. The sample size is higher and established considering the number of variables, the kind of analysis to realised, the past statistical power found and the Smart PLS prerequisite. Finally, the English version of questionnaire orient the panels choice and two different sample bases was selected (MTurk and Prolific) in order to test variance method bias (CMB) (Podsakoff *et al.*, 2003) as well as to verify some cross cultural differences. Table 4 present the two studies samples’ profiles.

## Findings

The objective of this conference is to present these two validation surveys. The present thesis employed advanced statistical techniques to analyze the data. Indeed, covariance-based structural equation modeling (SEM) using Smart PLS 4.0 was adopted to test the measurement model and assess the relationships between dimensions and constructs. Because POD was conceptualized as a second-order formative-reflective construct, the repeated indicators approach was used (Sarstedt *et al.*, 2019). This method allows for the appropriate modeling of higher-order constructs that combine formative dimensions with reflective indicators. The reliability was tested with factor loadings, reliability was assessed using Cronbach's alpha and composite reliability (CR), convergent validity was examined through average variance extracted (AVE), while discriminant validity was tested using the heterotrait-monotrait (HTMT) ratios. As discussed, nomological validity and predictive power was established by testing POD's relationships with related constructs such as perceived value, trust in the retailer, satisfaction, and loyalty.

The initial validation survey was conducted with 381 American consumers who had engaged in an omnichannel purchase journey within the previous month. As presented in table 4, respondents most frequently referred to Amazon (19%), Walmart (14%), Best Buy (9%), and Target (8%) as their retailers of reference. The demographic profile was well balanced across gender (56% male; 44% female), with annual household incomes between \$40,000 and \$79,999.

*Insert table 4 here*

*Insert table 5 here*

As presented in tables 5 and 6, reliability and convergent validity were established through factor loadings  $> 0.70$ , Cronbach's  $\alpha$  values ranging from 0.77 to 0.95, Composite Reliability (CR  $> 0.80$ ) except for three constructs not far to critical value, and Average Variance Extracted (AVE  $> 0.54$ ) generally high. The five first-order dimensions of POD omnipresence, reciprocity, similarity of experience, personalization, and hybridization all demonstrated strong reliability. At the second-order level, outer weights were statistically significant, while variance inflation factors (VIF  $< 2.5$ ) confirmed the absence of multicollinearity. Redundancy analysis further confirmed convergent validity, with a strong correlation between POD and omnichannel intensity ( $R^2 = 0.52$ ).

*Insert table 6 here*

The structural model tested nine hypotheses, all of which were supported. Table 7 and figure 1 show that POD exerted a strong positive influence on perceived value ( $\beta = 0.764$ ,  $p < 0.001$ ), which itself emerged as a key driver of both satisfaction ( $\beta = 0.589$ ,  $p < 0.001$ ) and trust ( $\beta = 0.572$ ,  $p < 0.001$ ). Beyond these indirect effects, POD directly impacted satisfaction ( $\beta = 0.152$ ,  $p = 0.002$ ), trust ( $\beta = 0.255$ ,  $p < 0.001$ ), and behavioral intentions ( $\beta = 0.152$ ,  $p = 0.002$ ). Satisfaction and trust also served as significant predictors of future intentions ( $\beta = 0.291$ ,  $p < 0.001$  and  $\beta = 0.413$ ,  $p < 0.01$ , respectively). The explanatory power of the model was substantial, with  $R^2 = 0.58$  for perceived value, 0.51 for satisfaction, 0.62 for trust, and 0.75 for behavioral intentions. Predictive validity (PLSpredict) confirmed that the model consistently outperformed a naïve benchmark, despite minor concerns about potential common method bias.

*Insert table 7 here*

*Insert figure 1 here*

A revalidation survey was subsequently conducted with 309 respondents, predominantly located in the England and Ireland (80%). As presented in table 4, retailer references differed due to regional context: Amazon (15%), Argos (9%), John Lewis (7%), and Marks & Spencer (6%) were most frequently mentioned. Product categories were broadly consistent with the first study, with clothing/footwear, electronics, and home improvement dominating omnichannel purchases. Demographic differences were notable: the revalidation sample included a higher proportion of women (58.5% vs. 44%), was slightly younger on average, and showed greater representation of consumers with annual incomes below \$40,000. These variations likely reflect cost-of-living differences and purchasing power disparities across regions.

Tables 5 and 6 present results of confirmatory factor analysis once again confirmed the reliability of first-order constructs, with factor loadings exceeding 0.70 for nearly all items (one reciprocity item fell slightly below at 0.68 but was retained for content validity). Cronbach's  $\alpha$  and composite reliability values all exceeded 0.70 and generally high, reinforcing the robustness of the scale. However, discriminant validity proved weaker in the revalidation, particularly for personalization and hybridization, and for social value within perceived value. These results align with the interpretation that certain dimensions of connected commerce 4.0 remain emerging constructs that are less integrated into consumer perceptions. At the second-order level, the formative–reflective structure of POD was once again validated, although redundancy analysis yielded weaker convergent validity than in the initial study. Specifically, correlations with harmonization ( $\beta = 0.547$ ) and omnichannel intensity ( $\beta = 0.604$ ) did not surpass the conventional 0.70 benchmark.

The structural model in the revalidation study yielded results, presented in table 7 and figure 2, both consistent with and divergent from the initial findings. POD continued to predict perceived value ( $\beta = 0.633$ ,  $p < 0.001$ ), satisfaction ( $\beta = 0.244$ ,  $p < 0.001$ ), and trust ( $\beta = 0.207$ ,  $p < 0.001$ ). However, in contrast to the first study, POD showed a negative direct relationship with behavioral intentions ( $\beta = -0.102$ ,  $p = 0.036$ ). Additional analyses suggested this may be explained by full mediation effects: once perceived value and satisfaction were removed as mediators, the relationship between POD and behavioral intentions became positive again. Other paths were consistent across both studies: perceived value predicted satisfaction ( $\beta = 0.536$ ,  $p < 0.001$ ), trust ( $\beta = 0.507$ ,  $p < 0.001$ ), and behavioral intentions ( $\beta = 0.291$ ,  $p < 0.001$ ), while satisfaction ( $\beta = 0.288$ ,  $p < 0.001$ ) and trust ( $\beta = 0.451$ ,  $p < 0.001$ ) also significantly predicted behavioral intentions.

*Insert figure 2 here*

Overall, the revalidation model explained 40% of variance in perceived value, 51% in satisfaction, 43% in trust, and 70% in behavioral intentions, slightly lower but comparable to the initial validation results (which reached up to 75%).

### **Theoretical and managerial contributions**

The main theoretical contribution of this thesis is the conceptualization of omnichannel density as a perceptual construct rather than an operational one. Unlike prior frameworks focused on channel count, integration, or similarity of experience, POD captures the cognitive and experiential aspects of omnichannel experience, thereby aligning research with consumer-centric perspectives in marketing theory. The originality of this study represents the combination of scientific and gray literature with nine in-depth interviews with retail managers to develop a pragmatic and practice-oriented measure of perceived omnichannel density.

Second, POD offers a refined vocabulary for examining omnichannel phenomena. Omnipresence reflects the brand's constant accessibility; reciprocity highlights bi-directional flows of value; similarity ensures consistency; personalization underscores adaptation to individual preferences; hybridization represents the blending of digital and physical interactions. Together, these dimensions enrich theoretical models of customer experience, service-dominant logic, and relationship marketing. This study distinguishes itself by modeling perceived omnichannel density as a reflective–formative construct: first-order dimensions are reflective, while the second-order construct is formative, aligning with recent research that highlights the need for multidimensional formative measures in omnichannel distribution (Jarvis *et al.*, 2003).

The t-value comparison concludes that, across industries, the most influential dimensions in shaping perceived omnichannel density are reciprocity, similarity, and personalization. These dimensions strongly impact the perceived value of the omnichannel journey, which in turn drives customer satisfaction, trust, and loyalty. In one of three surveys, omnipresence also emerged as significant, whereas channel hybridization did not. Previous studies highlight various factors influencing customer satisfaction and loyalty, such as service, social communication, financial value (Rahmam *et al.*, 2022), integration, similarity, and connectivity (Shi *et al.*, 2020a). The work of Lee and Kim (2010) aligns closely with this thesis, linking freedom of choice and connectivity to omnipresence and reciprocity. Additionally, channel depth and content consistency are recognized as essential for a seamless experience, affecting usage intentions (Shen *et al.*, 2018).

Managerially, POD provides a diagnostic tool enabling retailers to evaluate omnichannel maturity and prioritize strategic investments. By measuring consumer perceptions or importance across its five dimensions, firms can identify areas of strength or weakness and align their strategies with evolving customer expectations of Connected Commerce 4.0.

This research shows that higher perceived omnichannel density enhances customer value, trust, satisfaction, and future behavioral intentions, reassuring retailers that adopting omnichannel strategies can boost key performance indicators, strengthen loyalty, and increase long-term customer lifetime value—ultimately driving shareholder value and return on investment.

Finally, the portability of POD beyond retail-specific contexts suggests broader implications. Its principles may apply to service ecosystems, cultural industries, or even public engagement, offering a foundation for a wider theory of digital density.

## **Limitation**

Although this research followed established guidelines for scale development (Churchill Jr, 1979; DeVellis, 2016; Hair Jr *et al.*, 2021), it has some limitations. First, the current scale was developed and tested in English with samples from the U.S., Canada, and the U.K. Future research should translate and validate the measure in French-speaking contexts (e.g., Québec, France) to enable cross-cultural comparisons of omnichannel practices. Very few studies have examined cultural differences in omnichannel behaviors (Ameen *et al.*, 2021; Yurova *et al.*, 2017), making this an important research opportunity.

A second limitation concerns data collection. Online panels (Amazon MTurk, Prolific) offer fast and cost-efficient access but raise issues of external validity and common method variance. Some respondents may misreport or even automate responses, reducing data quality (Thomas et Clifford, 2017). While steps were taken to minimize bias, future research could employ experimental

vignette studies, real purchase contexts (e.g., smart stores vs. traditional stores), or retailer-specific samples to test predictive validity more rigorously (Podsakoff *et al.*, 2003).

Another limitation relates to scope. Most respondents evaluated department store experiences, with electronics, apparel, and general merchandise dominating the sample. Testing the scale in specific sectors (e.g., grocery, fashion, tourism, education) would enhance external validity (Lajos *et al.*, 2009). Additionally, two emerging commerce 4.0 dimensions, hybridization and personalization, showed weaker factor weights and minor discriminant validity issues, suggesting they may evolve with advances in AI, VR, and AR. Related constructs such as privacy risk could also be integrated in future iterations (Kowalkiewicz *et al.*, 2017).

Finally, methodological design issues remain. The lack of reflective–formative validation and reliance on single-questionnaire Likert scales introduce risks of common method bias (Podsakoff *et al.*, 2012). Although mitigation was applied, future studies should combine multiple data sources, measurement formats, and marker variables to strengthen validity.

Overall, while the proposed scale demonstrates reliability and validity, further testing across contexts, cultures, and methods is essential to refine its predictive power and ensure long-term relevance.

### **Conclusion**

This research advances both theory and practice by introducing POD as a comprehensive and validated measure of omnichannel experience. It demonstrates that consumer perceptions of density encompassing omnipresence, reciprocity, similarity, personalization, and hybridization are central to creating value, building trust, enhancing satisfaction, and securing loyalty. By capturing the richness of omnichannel ecosystems, POD contributes to a more nuanced understanding of consumer experience in the digital age and provides actionable insights for retailers navigating the future of distribution.

References are available upon request.

Table 1: Major omnichannel constructs and scale

Dimensions and Researchers	Integration	Complementarity	Synergy	Choice liberty	Personalization	Omnipresence	Interactivity	Tele presence
Omnichannel integration (OI2) (Chiu <i>et al.</i> , 2011)	X							
Crosschannel integration (Li <i>et al.</i> , 2018)	X							
Channel harmonization (Van Baal, 2014)	X							
(harmonization)								
Omnichannel Consumer (OCC) (Yurova <i>et al.</i> , 2017)	X							
Channel integration perception (CI2) (Zhang <i>et al.</i> , 2018)	X	X						
Complementary and synergy (Wagner <i>et al.</i> , 2013)		X (complementarity)	X (synergy)					
Omnichannel intensity (Huré <i>et al.</i> , 2017; Lazaris <i>et al.</i> , 2014)	X (similarity)		X (coherence)					
Multichannel integration (MCI1) (Frasquet et Miquel, 2017)	X (coordination)	X reciprocity		X				
Chan et Pan (2005)	X (reinforcement)	X (reciprocity and complementarity)	X					
Perceived integration level (Schramm-Klein <i>et al.</i> , 2011)	X			X				
Multichannel distribution perception (Lee et Kim, 2010)	X (consistency)	X reciprocity	X (reciprocity)	X				
(Pentina et Hasty, 2009) (Expert evaluation)	X	X	X	X				
Omnichannel capacity (Ürgüplü et Yumurtacı Hüseyinoğlu, 2021)	X (Coherence)		X (Synergy)				X (social)	
Perceived omnichannel experience (Shi <i>et al.</i> , 2020)	X	X	X		X			
(Shen <i>et al.</i> , 2018)	X	X	X	X		X		

Table 2: In depth interview sample (n=10)

Code	Type	Industry
Code 1	Omnichannel consultant	Strategic solution
Code2	Advanced national retailer	Animal products
Code3	Retailer association	Canadian association
Code4	Retailer association	Canadian association
Code5	Omnichannel consultant	Strategic solution
Code7	Non advanced independent retailer	Health and beauty
Code6	Omnichannel consultant	E-commerce Platform
Code9	Non advanced regional retailer	Fashion
Code8	Advanced international retailer	Children fashion
Code10	Advanced international retailer	Fashion

Table 3 : Delphi interview nationality of panelists

Nationalités	Nombre
Canadien	1
Grec	1
Français	1
Espagnol	1
Australien	1
Brésilien	1
Allemand	1
Finlandais	1
Asiatique	1

Table 4 : Samples profiles

	Pilot study (n=114)	Validation study (n=381)	Revalidation study (n=309)
<b>Gender</b>			
Male	46,3 %	55,9 %	41,5 %
Female	53,7 %	44,1 %	58,5 %
<b>Age</b>			
Less than 30 years old	21,3%	18,3 %	21,0 %
From 30 to 39 years old	35,2%	38,1 %	34,4 %
From 40 to 49 years old	20,2%	26,0 %	23,6 %
Over than 49 years old	23,1%	17,6 %	21 %
<b>Marital status</b>			
Married	61,1%	63,0 %	43,2 %
Single	25,9%	26,7 %*	37,3 %
common-law partner	2,6%	2,9 %*	12,3 %
other	10,3%	7,4 %	6,2 %
<b>Education</b>			
Primary and High school	7,4%	18,5 %*	19 %
Collegial	20,4%	13,3 %*	N/A
Bachelor	46,3%	54,6 %	58 %
Master and doctoral	26,0%	13,5 %	23 %
<b>Personal income</b>			
Less than 40 000\$	20,4%	28,2 %	53,8 %
40 000\$ to 79 999\$	59,3%	73,3 %	36,2 %
Over than 79 999\$	20,4%	18,4 %	10,0 %
<b>Past experience with retailer</b>			
Never	0%	0 %	0 %
Rarely	0%	2,4 %	7,1 %
Sometime	25,2%	25,2 %	45,0 %
Often	53,3%	52,0 %	39,5 %
Very often	21,5%	20,4 %	8,4 %

Table 5: Factor loadings of three studies

Constructs	Factor loadings validation study	Factor loadings revalidation study
<b>Omnipresence</b>		
I can access retailer X's touchpoints anytime for the necessary information or service.	0,83	N/A
I can use retailer X's touchpoints "anywhere" at the point of need.	0,85	0,84
I can use retailer X's touchpoints "anytime" at the point of need.	0,86	0,84
Multiple retailer X's touchpoints enables me to order products or services at any time.	0,84	0,78
I can access retailer X's products or services in a variety of ways (e.g., mobile phone, physical contact, interactive touch screen, vocal search, virtual reality, virtual chat, chatbot, etc.).	0,82	0,70
<b>Reciprocity</b>		
It is easy to collect at a physical store goods purchased over the digital touchpoints.	0,78	0,76
It is convenient to return goods I have bought on retailer x's digital touchpoints to any of their physical stores.	0,75	0,78
Retailer x's digital touchpoints enables me to place a courtesy hold on products in a local store.	0,71	0,76
It is easy to get information about order and delivery status (also for products ordered offline) on every retailer x's touchpoints.	0,67	N/A
At retailer x's digital touchpoints it is easy to get real-time information on product availability in a physical store.	0,76	0,68
<b>Similarity</b>		
Retailer x offers same prices over every of his touchpoints.	0,81	0,78
Retailer x offers the same promotions over every of his touchpoints.	0,71	0,81
Retailer x provides consistent store images (advertising, logo, text, color, video, etc) over every of his touchpoints..	0,76	0,75
Retailer x's service delivery is consistent across every of his touchpoints.	0,79	0,78
<b>Personalization</b>		
Retailer x's touchpoints enable me to order products or services that are personalized for me.	0,80	0,82
The advertisements and promotions retailer x's touchpoints send to me are tailored to my situation.	0,81	0,86
Retailer x's digital touchpoints browsed to me online pages are customized based on my historical purchase records and personal informations across his different touchpoints.	0,74	N/A
Retailer x's touchpoints provide me with optimal information or service that is relevant to me based upon where I am.	0,75	0,85
I have impression that retailers x know a lot about me, and my real time state of mind and interact with me.	0,68	N/A
Retailer x's touchpoints provide me with optimal information or service that is relevant to me based upon what I am interested.	N/A	0,89
<b>Hybridization</b>		
Retailer X's digital touchpoints offer to me some features who make products appear as real, natural and tangible (ex. simulator, 360° pictures, virtual reality or augmented reality).	0,71	0,80
Retailer X's digital touchpoints allow to me to easily get in touch with brand representative as if I was physically in store (ex. online chat session, Chatbot, Live video interaction).	0,79	0,73
Retailer X's digital touchpoints allow me to live an experience near the physical reality where it's difficult to me to perceive the difference between physical and digital touchpoints.	0,79	0,90
Retailer X's physical touchpoints allow me to live a digital experience where I have the feeling to navigate in the digital world.	0,87	0,84

Table 6: Convergence index for three studies

	Validation study			Revalidation study		
	Cronbach ( $\alpha$ )	CR	AVE	Cronbach ( $\alpha$ )	CR	AVE
Omnipresence	0.895	0.895	0.705	0.797	0.797	0.625
Reciprocity	0.788	0.788	0.541	0.736	0.743	0.557
Similarity	0.766	0.766	0.588	0.787	0.796	0.609
Personalization	0.801	0.801	0.627	0.830	0.832	0.666
Hybridization	0.816	0.816	0.576	0.874	0.878	0.726
Satisfaction	0.868	0.730	0.649	0.875	0.877	0.800
Patronage Intention	0.907	0.900	0.670	0.943	0.945	0.780
Trust	0.892	0.893	0.756	0.884	0.898	0.746
Value efficacy	0.868	0.877	0.720	0.855	0.869	0.701
Value hedonic	0.907	0.908	0.729	0.918	0.922	0.753
Value ROI	0.855	0.860	0.633	0.861	0.862	0.643
Value Social	0.954	0.959	0.878	0.946	0.946	0.861

Notes : CR = Critical ratio, AVE = Average variance extracted

Table 7: Hypothesis testing of three studies

Hypotheses	Validation study				Revalidation study			
	$\beta$	T-value	P-value	Hypothesis test	$\beta$	T-value	P-value	Hypothesis test
H1: $POD \rightarrow PV$	0,764	28,466	< 0,001	Confirmed	0,633	13,387	< 0,001	Confirmed
H2: $PV \rightarrow SATIS$	0,589	9,145	< 0,001	Confirmed	0,536	9,049	< 0,001	Confirmed
H3: $PV \rightarrow PI$	0,112	2,071	= 0,04	Confirmed	0,291	4,697	< 0,001	Confirmed
H4: $SATIS \rightarrow PI$	0,291	5,849	< 0,01	Confirmed	0,288	4,646	< 0,001	Confirmed
H5: $PV \rightarrow TRUST$	0,572	8,399	< 0,001	Confirmed	0,507	8,829	< 0,001	Confirmed
H6: $TRUST \rightarrow PI$	0,413	7,615	< 0,01	Confirmed	0,451	7,875	< 0,001	Confirmed
H7: $POD \rightarrow SATIS$	0,152	2,266	= 0,002	Confirmed	0,244	3,787	< 0,001	Confirmed
H8: $POD \rightarrow TRUST$	0,255	3,756	< 0,01	Confirmed	0,207	3,367	< 0,001	Confirmed
H9: $POD \rightarrow PI$	0,152	3,132	= 0,002	Confirmed	-0,102	2,101	= 0,036	Rejected

POD: Perceived omnichannel density, PV: perceived value, SATIS: Satisfaction, PI: Patronage intention, TRUST: trust

Figure 1: Validation study model and results

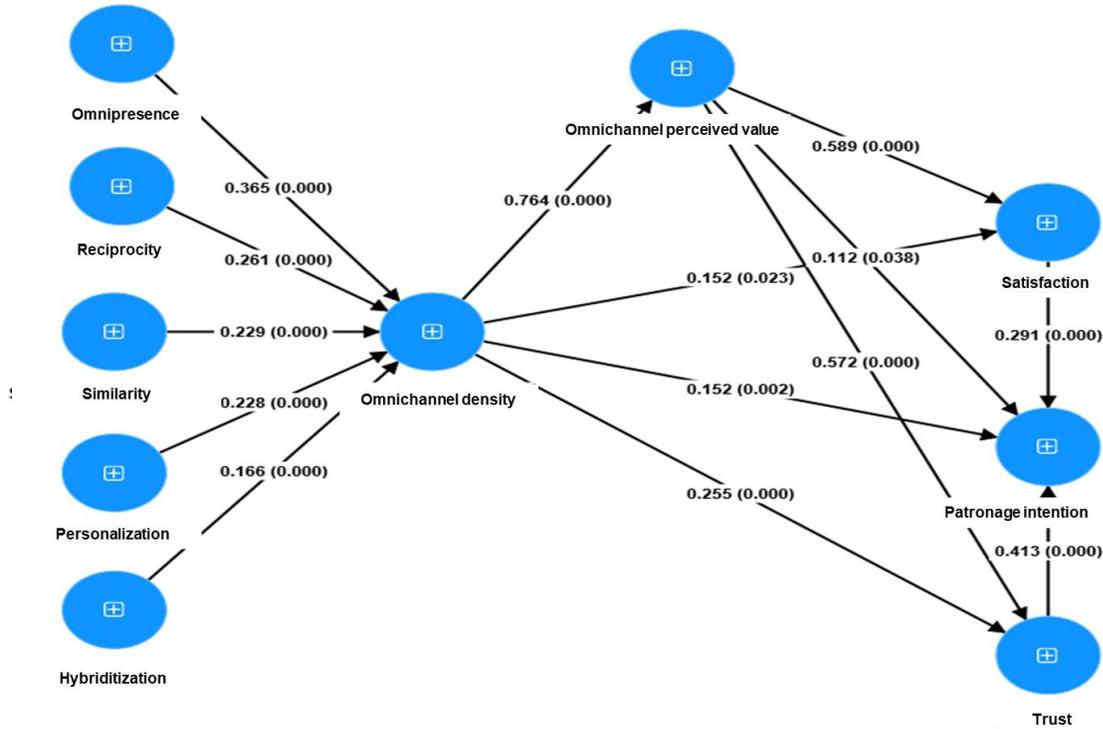
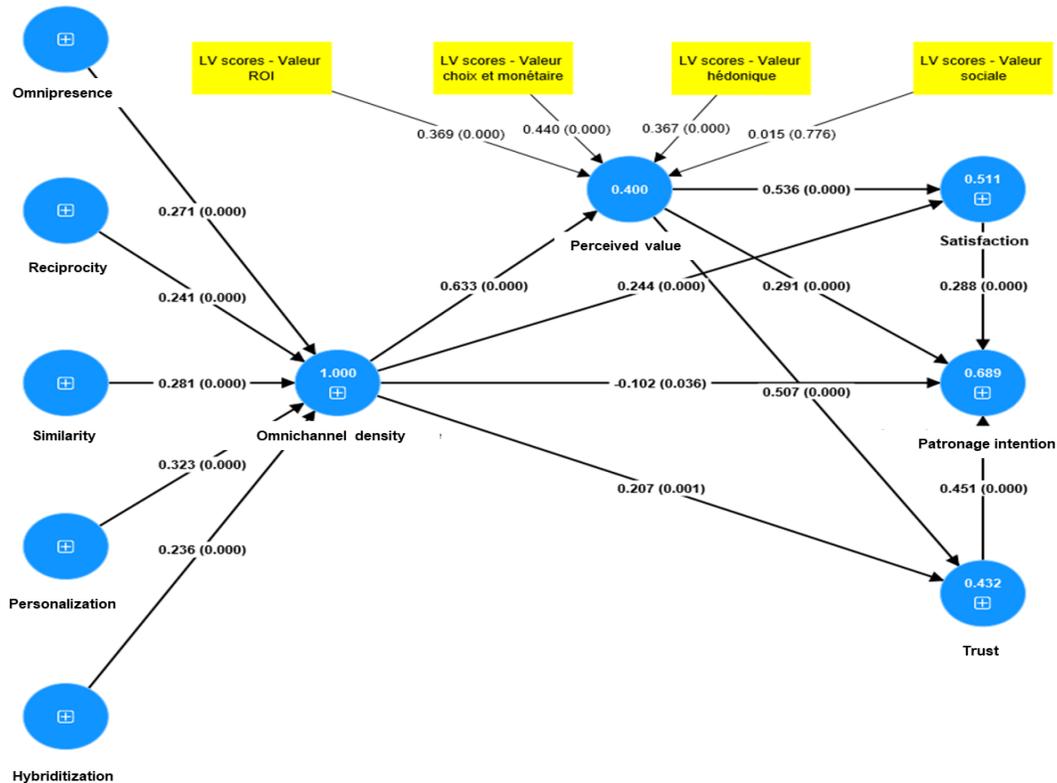


Figure 2: Revalidation study model and results



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