Are product categories driving omnichannel performance?

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Abstract

In this paper, we investigate whether product categories moderate the relations between channel integration and performance. We have collected data from 412 omnichannel companies (that developed offline and online sales channels) offering various product categories. Based on our analysis, we have outlined that the level of channel integration has a strong and statistically significant impact on performance (short-term, long-term, and comparative performance). This relation is moderated by a product category. The moderating effect is the strongest in the case of two product categories: low-risk / utilitarian (i.e., craft supplies, home & garden) and high-risk/utilitarian (i.e., computing, electronics) and the weakest (but still positive) for a low-risk / hedonic category (i.e., toys, books). Therefore, in this study, we expand previous research by revealing the moderating role of the product category in how channel integration affects performance.

Keywords: *channel integration, product categories, omnichannel performance*

Track: Retailing & Omni-Channel Management

1. Introduction

Channel integration has already attracted much attention among scholars and marketing practitioners, mainly due to the evolution of customer awareness and connectivity (Basu et al., 2023) as well as the remarkable growth of technological advancement (Kumar et al., 2022), transforming retail business models and creating a new retail environment (Cai & Lo, 2020; Zhao et al., 2023; Salvietti et al., 2024). Despite valuable theoretical advancements, the factors influencing retailers' adoption of various degrees of cross-channel integration remain limited (Xue et al., 2024). Those limitations are mainly caused by the complexity of omnichannel environments, which brings difficulties to the comprehensive investigation. Therefore, although previous studies cover some aspects of those environments, such as channel characteristics (Bèzes, 2021), retail types (Lim et al., 2022), and the number of touchpoints offered by the retailer (Acquila-Natale and Chaparro-Peláez, 2020), still some blind spots may be outlined. One of them concerns the product category.

In this paper, we explain how product categories moderate the relations between channel integration and performance. Our quantitative investigation of 412 omnichannel companies operating in different product categories shows that channel integration positively affects performance, and this relation is moderated by a product category. The moderating effect is the strongest in the case of two product categories: low-risk / utilitarian and high-risk/utilitarian, and the weakest (but still positive) for a low-risk / hedonic category.

The rest of the paper is organized as follows: Section 2 presents the theoretical background and hypotheses development, Section 3 presents the research design, Section 4 presents the results, and Section 5 presents the discussion and conclusions.

2. Theoretical background and hypotheses development

The omnichannel concept is defined as the *"degree to which different channels interact with each other"* (Herhausen et al., 2015, p. 310), and that interaction is assessed, on the one hand, by execution metrics vital for retailers, and on the other hand by the perception that is crucial from customers standpoint (Salvietti et al., 2022).

There are various metrics of omnichannel execution. The most common is effectiveness, which is measured by the company's performance achieved (Tagashira & Minami, 2019). A study performed by Kolbe et al. (2022) demonstrated that multichannel integration increases the company's performance. Also, Kajalo and Lindblom (2015) outlined the linkage between integrating marketing capabilities and optimizing business performance, while coordination

across various channels has been proven to improve profitability (Lee et al., 2018; Lim et al., 2022).

Based on these considerations, we have proposed the following hypothesis:

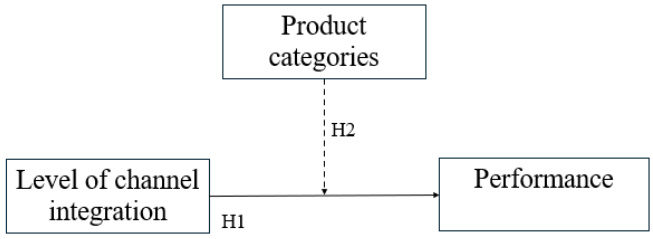
H_1: Level of channel integration impacts performance.

Researchers have already pointed out that the channel transition process is driven by the retailer's brand portfolio (Larke et al., 2018). Moreover, the ability to optimize the omnichannel model is affected by the complexity of product category characteristics (Larke et al., 2018). Previous studies suggest that product features may foster or hinder omnichannel efforts (Hajdas et al., 2022). However, the question of how particular product categories affect the relationship between channel integration and performance remains unanswered. Therefore, we follow the suggestions provided by Berman and Thelen (2018) to study the differences among product types, as various types of goods impact the customers' experience regarding different channels or even devices used during the purchasing process. In our study, we follow an established typology of product categories based on two product characteristics: motivation (utilitarian vs hedonic) and perceived risk (high vs low). Previous studies showed that product category characteristics moderate the relationship between channel preference and the monetary value of customers (Kuswaha & Shankar, 2013). Multichannel customers were found to be the most valuable segment only in the case of hedonic product categories; single-channel customers were found to provide higher monetary value in the case of utilitarian categories, and traditional channel customers were found to provide higher monetary value in the case of low-risk categories (Kuswaha & Shankar, 2013). Based on these findings, it is safe to hypothesize that:

H_2: Product category moderates the relationship between the level of channel integration and performance.

The conceptual model presenting our hypotheses is presented in Figure 1.

Figure 1. Conceptual model



Source: own work

3. Research design

Sample and data collection

To investigate channel integration, our sample consisted of companies that developed simultaneously offline and online channels to sell their products. We applied random sampling (we considered 71,000 companies as the population of online shops operating in Polish retail). We assumed a confidence level of 95% and an assumption of 50% response distribution, with the acceptable margin of error being 5%. Thus, the expected sample size was 383, while our final sample was slightly higher (N=412). We have followed the concept of Kushwaha & Shankar (2013) and divided our sample into 4 product categories: Group 1 (high risk, utilitarian): computing, telecommunication equipment, electronics, musical instruments, photography and video, sports equipment (N=69), Group 2 (high risk, hedonic): jewelry, beauty & cosmetics, wines, apparel, collectibles (N=143), Group 3 (low risk, utilitarian): pet items, automotive accessories, craft supplies, home & garden, office supplies (N=85), Group 4 (low risk, hedonic): toys, arts, home furnishing, gifts & holidays, CDs & DVDs, books (N=109). The diversified N is reflected by different representations in e-commerce (i.e., apparel, footwear, cosmetics, and hobbies account total for the largest share of e-commerce (PwC, 2024)). The data was collected by a professional agency. Our respondents were chosen based on the restricted criteria of expert knowledge (Bagozzi et al., 1991). Accordingly, their position at the company was related to channel integration in diversified aspects (IT, sales, marketing). We used the mixed-mode survey (CATI, CAWI, PAPI, and CAPI) with a 7-point Likert scale.

Variables operationalization

To operationalize our constructs, we used scales already validated in previous studies. Therefore, to measure the level of channel integration, we used the scales from Cao and Li (2015) and Shi et al. (2020). Performance was measured as a multidimensional construct using a multi-item, subjective scale, divided into 3 sub-constructs: (1) long and (2) short-term performance (Czakon et al., 2023) and (3) comparative performance (Czakon et al., 2020). Detailed information with Cronbach's α is presented in Table 1.

Table 1. Items, constructs, sub-constructs, and Cronbach's alpha (for all product categories)

Items	Code	Construct / sub-constructs	Cronbach's α
My company has well-developed aligned services across channels	CI1	**Level of channel integration**	0.915
My company has a well-developed aligned price across channels	CI2		
My company has a well-developed aligned loyalty program across channels	CI3		
My company has a well-developed aligned assortment across channels	CI4		
My company has a well-developed integration of information systems across channels	CI5		
My company has a well-developed integration of a database of clients across channels	CI6		
In my company, the customer's interactions across different channels are integrated	CI7		
In my company, the descriptions of products are integrated across different channels.	CI8		
In my company, new product launches are synchronous across different channels.	CI9		
In my company, the product attributes can be equally allocated across different channels.	CI10		
In my company, the promotion activities are aligned across different channels.	CI11		
Meeting sales objectives	SP1	**Short-term performance**	0.759
Achieving sales growth	SP2		
Meeting profitability targets	SP3		
Increasing profitability	SP4		
Meeting the company's strategic goals	LP5	**Long-term performance**	0.863
Introducing new products/services	LP6		
Introducing more new service products than competitors	LP7		
New products/services achieve market success	LP8		
Sales	CP1	**Comparative performance**	0.856
Profit	CP2		
Market share	CP3		
Return on investment	CP4		

Source: own work

Model validation

We employed a thorough process to validate our model, ensuring that it met the necessary standards of reliability and validity. First, we evaluated the internal consistency of our measures by conducting a reliability analysis. The Cronbach's alpha values, which ranged from 0.7 to 0.95, confirmed that all measures were reliable and fell within the generally accepted threshold for internal consistency (see Table 1). Next, we assessed convergent validity, which examines whether items that are supposed to measure the same construct are actually related. We did this by analyzing standardized factor loadings, composite reliability (CR), and average variance extracted (AVE). All factor loadings were above the recommended 0.5 threshold, demonstrating that each item contributed significantly to its underlying construct (see Figure 2). Additionally, CR values were all above 0.7, which aligns with the standards set by Bagozzi et al. (1991), providing further evidence of strong internal reliability (see Table 2). While most AVEs were above 0.5, as recommended by Fornell & Larcker (1981), the AVE for the level of channel integration construct was slightly below this threshold. However, Fornell & Larcker (1981) also suggest that if the AVE exceeds 0.4 and the CR is higher than 0.6, convergent validity can still be considered acceptable. In this case, both conditions were met, affirming the convergent validity of this construct. Finally, we tested for discriminant validity. The square root of the AVE for each construct is higher than its correlations with other constructs, which

is a key indicator of discriminant validity. This confirms that the constructs are not only reliable but also distinct from one another. In summary, the results from our validation process provide strong support for the model's reliability and its convergent and discriminant validity, confirming that our measures accurately reflect the constructs they are intended to measure while remaining distinct from other variables in the model.

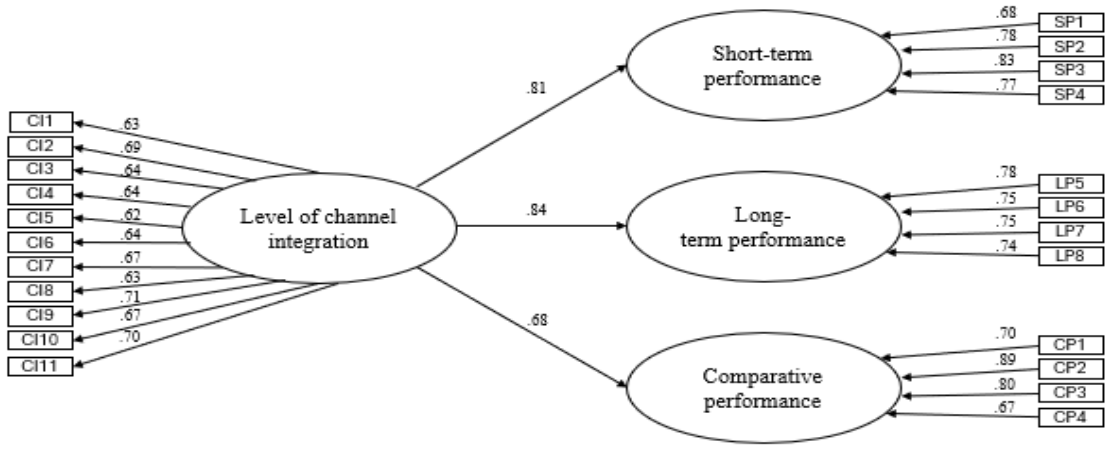
Table 2. Convergent and discriminant validity (for all product categories)

	CR	AVE	Level of channel integration	Short-term performance	Long-term performance	Comparative performance
Level of channel integration	0,909	0,478	**0,691**			
Short-term performance	0,852	0,592	0,652	**0,769**		
Long-term performance	0,852	0,590	0,679	0,765	**0,768**	
Comparative performance	0,854	0,598	0,531	0,730	0,752	**0,773**

Source: own work

The next phase of our analysis involved building the structural model to test our hypotheses and verify the relationships between constructs. We used IBM SPSS Amos (version 29) for this purpose. To assess the significance and fit of the measurement model, we applied confirmatory factor analysis (CFA). This step was essential for validating the structure of our model and ensuring the indicators accurately reflected the underlying theoretical concepts. To improve the fit of the model, we performed a modification index (MI) analysis, following the approach outlined by MacCallum et al. (1992). While it is common to introduce error covariances when the MI exceeds 4, we applied a stricter threshold in our analysis, only making adjustments when MI values were greater than 10. We evaluated the model's goodness of fit using several indices. The standardized chi-square (χ^2/df) is 1.462, significantly below the accepted threshold of 5, indicating a good fit. The root mean square error of approximation (RMSEA) is 0.034, further supporting this, with the 90% confidence interval showing a lower bound close to zero (0.025) and an upper bound (0.042) well below the maximum acceptable value of 0.080. The goodness of fit index (GFI) and the adjusted goodness of fit index (AGFI) are 0.943 and 0.921, respectively, both exceeding the ideal benchmark of 0.9. In addition, other fit indices confirm the strength of the model, with the incremental fit index (IFI), Tucker-Lewis index (TLI), and comparative fit index (CFI) all exceeding the required minimum of 0.9, with values of 0.984, 0.979, and 0.983, respectively. The parsimony fit indices also suggest a well-fitting model, with the parsimony goodness of fit index (PGFI) at 0.680 and the parsimony normed fit index (PNFI) at 0.747, both above the threshold of 0.6.

Figure 2. Structural model (for all product categories)



Source: own work

4. Research results

The model demonstrated a satisfactory fit with the empirical data, establishing a solid basis for further analysis, including the evaluation of the research hypotheses. Our research shows that the level of channel integration has a strong and statistically significant impact on short-term, long-term, and comparative performance (H_1). Thus, hypothesis H_1 has been positively validated. Further, we tested whether product categories affect the relationship between the level of channel integration and performance (H_2). The data in Table 3 illustrate the relationship between the level of integration and different types of performance (short-term, long-term, and comparative) across various product categories divided into four groups. The level of channel integration has a positive effect on performance across all groups, with stronger impacts on long-term and short-term performance than on comparative performance. Group 3 (low-risk and utilitarian products) shows the strongest relationships across all metrics, particularly in short- and long-term performance, while Group 4 (low-risk, hedonic) tends to show the weakest but still positive correlations. The strongest impact of the level of channel integration on comparative performance comes from Group 1 (high-risk and utilitarian products). Therefore, hypothesis H_2 has been confirmed.

Table 3. Relationships between level integration and performance across product categories

Path	All	Group 1	Group 2	Group 3	Group 4
Level of channel integration -> short-term performance	0,809***	0,789***	0,720***	0,924***	0,722***
Level of channel integration -> long-term performance	0,844***	0,886***	0,796***	0,908***	0,703***
Level of channel integration -> comparative performance	0,675***	0,750***	0,692***	0,697***	0,513***

***p<0.001, Source: own work

5. Discussion and conclusions

In this study, we wanted to investigate whether product characteristics impact the relationship between channel integration and performance. By applying a quantitative hypothetico-deductive research approach, we have acquired a deeper understanding of the phenomenon and were able to fill the research gap indicated by previous studies (Hajdas et al., 2022; Berman &Thelen, 2018). Our results confirm that the level of channel integration has a strong and statistically significant impact on performance (short-term, long-term, and comparative performance), which is in line with previous studies (Lee et al., 2018; Lim et al., 2022; Kolbe et al., 2022). Our research also demonstrates that this relationship is moderated by a product category, which extends the study of Kuswaha & Shankar (2013), who showed that product category characteristics moderate the relationship between channel preference and the monetary value of customers. We expand previous research by confirming the moderating role of the product category in how channel integration affects performance.

Our study is not without limitations. First, we have investigated a single-country research sample. Although the types of products are rather universal, channel integration may be addressed by companies in various ways that reflect industry and country specifics (i.e., legal constraints). Thus, a more comprehensive and comparable study should be performed to gather the data from several countries. Based on a diversified sample, some idiosyncrasies could be derived. Second, we have focused on the quantitative investigation of the examined relationships. Such an approach hindered more nuanced exploration. Thus, future exploratory studies could investigate the reasons why particular product categories foster or hinder the performance of channel integration. Identifying the root causes of diversified outcomes of omnichannel strategies in different product contexts would allow omnichannel scholars and practitioners to conceptualize and develop adequate strategies to mitigate the risks related to omnichannel implementation in these contexts.

Our results offer the following course of action for omnichannel managers: as performance resulting from omnichannel implementation varies across product categories, managers should be cautious when expecting similar outcomes from a varied product portfolio. Instead, a diversified omnichannel KPIs seem a more reasonable approach.

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