

Phygital Consumer Behavior across Generations: Evidence from Poland

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Abstract—The dynamic development of digital technologies in the third decade of the 21st century has blurred the boundaries between online and offline shopping, creating the so-called phygital environment. Previous research has emphasized the role of digital tools in shaping customer experiences, yet little is known about how generational differences influence consumers' propensity to engage in phygital behaviors. This article addresses this gap by presenting the results of a quantitative study conducted in Poland on a representative sample of 2,160 adult consumers. The analyses revealed a statistically significant, though relatively weak, negative correlation between consumers' age and their inclination toward phygital behaviors: younger generations (Z and Y) more frequently integrate digital and physical channels, while the Baby Boomer generation scores the lowest. However, age explains only a small portion of the variance ($R^2 = 0.067$), suggesting that motivational factors such as shopping pragmatism, pleasure (hedonism), comfort, and emotional engagement play a more substantial role. The findings contribute theoretically by indicating that generational differences are important but insufficient to fully explain phygital behaviors, and practically by highlighting the need to design omnichannel strategies that consider not only demographic but also psychographic and behavioral criteria.

Keywords—phygital consumer behavior, generational differences, hybrid consumption, omnichannel strategies, digital economy, Poland

I. INTRODUCTION

The development of digital technologies in the third decade of the 21st century has significantly transformed consumer behavior, offering new opportunities in the decision-making process. Increasingly, consumers use both traditional, physical sales channels and digital channels, creating a so-called phygital environment in which physical and digital experiences are integrated in a coherent and interactive way (Pantano & Priporas, 2016; Batat, 2019; Lemon & Verhoef, 2016). In this environment, digital technologies such as mobile applications, interactive kiosks, and AR and VR systems enable the creation of more engaging shopping experiences, while consumers gain access to real-time information, which directly affects their purchasing decisions (Hilken *et al.*, 2018; Pantano & Gandini, 2017).

Age is one of the key factors shaping phygital behaviors. Research indicates that younger generations, such as Millennials and Generation Z, are more open to new technologies and more willing to incorporate them into everyday life, whereas older consumers more often demonstrate skepticism toward digital innovations, prefer traditional in-store shopping, and show lower levels of trust toward online transactions (Pew Research Center, 2019;

Verhoef *et al.*, 2015; Kim & Forsythe, 2008). Younger generations are also more likely to take advantage of personalized offers and data-driven recommendations, as well as interactive in-store tools, while older consumers more often prefer direct interaction with sales staff and simpler shopping formats (Hsu & Chen, 2018; Lemon & Verhoef, 2016).

Despite an increasing number of studies conducted by scholars, the literature still lacks systematic quantitative analyses of the relationship between age and phygital behaviors among consumers. For this reason, research conducted in Poland is relevant both theoretically—by offering deeper insights into the nature of phygital behaviors within a large EU member state—and practically—by enabling managers to design omnichannel strategies tailored to the needs of different age groups.

Accordingly, this article focuses on determining whether there is a relationship between consumers' age—understood as membership in the Baby Boomer (BB), X, Y, and Z generations—and their propensity to engage in phygital behaviors in Poland. In this context, two research questions were formulated:

RQ1: Does the age of Polish consumers (broken down into BB, X, Y, and Z generations) significantly affect their propensity to engage in phygital behaviors?

RQ2: Is the age of Polish consumers (broken down into BB, X, Y, and Z generations) the most important factor influencing their propensity to engage in phygital behaviors?

Answering these questions and analyzing the issues at hand will help fill the research gap in the literature on phygital behaviors in Central Europe and provide practical guidance for managers in designing consistent and engaging shopping experiences adapted to different generational groups.

II. LITERATURE REVIEW

The growing interest of scholars in research related to phygital behaviors clearly indicates that the integration of physical and digital experiences has become a key element of the market in the third decade of the 21st century. Del Vecchio *et al.* (2023) argue that phygital technologies foster innovation and increase customer engagement in purchasing processes, emphasizing the importance of effectively combining offline and online channels. However, their analyses did not take demographic or generational differences into account, leaving a gap in understanding which age groups are more inclined to adopt phygital solutions. In turn, Hilken *et al.* (2017, 2018) and Javornik (2016) demonstrated that AR and VR technologies enhance

satisfaction, consumer engagement, and the perceived value of shopping experiences. While these studies confirmed the significance of immersive experiences for consumer loyalty, they too did not analyze generational differences or the influence of age on the adoption of new technologies.

Pantano *et al.* (2015, 2016, 2017) investigated the integration of digital and physical channels, showing that omnichannel environments increase interactivity, convenience, and customer satisfaction. These findings confirmed that consumers actively use multichannel shopping paths; however, the lack of generational analysis limits our understanding of how different age groups engage in such processes. Similarly, Pantano and Priporas (2016) demonstrated the positive impact of mobile technologies on shopping experiences, yet without examining which generations are most likely to adopt them.

An important contribution to the development of the phygital customer experience concept was made by Batat (2019, 2022, 2023), who emphasized the need to design experiences that integrate offline and online elements. Her analyses suggest that younger generations are more willing to adopt phygital solutions, whereas older ones approach them more cautiously and with greater skepticism. However, there is still a lack of quantitative data to empirically verify these observations within specific national contexts, such as Poland.

The issue of personalization in phygital experiences also appears in the research of Anwar *et al.* (2025), who highlighted the role of innovative products in engaging consumers and supporting sustainable consumption. As with earlier studies, however, the authors did not analyze the impact of age or generational belonging. Flavián, Ibáñez-Sánchez, and Orús (2019), as well as Poushneh and Vasquez-Parraga (2017), found that AR and VR technologies increase interactivity, immersion, and customer satisfaction, but these studies too lacked a systematic analysis of intergenerational differences.

Another important research stream addresses hedonic and utilitarian motivations in the phygital environment. Already Hirschman and Holbrook (1982), and later Batra and Ahtola (1991), Babin *et al.* (1994), and Arnold and Reynolds (2003), pointed out that shopping serves both practical and hedonic functions. Subsequent studies by Jones *et al.* (2006) noted that such preferences may differ depending on age. Yet again, there is a lack of quantitative analyses that would link hedonic and utilitarian motivations with generational belonging in the phygital context.

The literature increasingly emphasizes the prosumer character of consumers, who not only consume but also co-create value, for example through reviews, recommendations, or participation in brand communities (Pralhad & Ramaswamy, 2004; Krowicki & Maciejewski, 2024; Maciejewski *et al.*, 2019, 2020). In the phygital environment, however, such activity may vary significantly across generations, which further underscores the need for comparative generational studies.

At the same time, research on the relationship between phygital behaviors and sustainable consumption is expanding. Some analyses suggest that digital environments encourage undesirable phenomena, such as impulsive shopping or high return rates that generate waste (Stevenson & Rieck, 2024).

Other studies (Mont *et al.*, 2022; Schürmann *et al.*, 2023), however, show that consumers differ in their levels of ecological awareness and willingness to adopt solutions that support sustainability. Yet the absence of systematic analyses on the relationship between age and pro-environmental behaviors in the phygital environment leaves this issue unresolved as well.

In summary, previous studies have focused primarily on the functional and emotional aspects of phygital experiences, highlighting the importance of personalization, immersion, and presumption. Nevertheless, there remains a shortage of quantitative analyses capable of capturing generational differences in openness to technology, hedonic and utilitarian preferences, and tendencies toward sustainable consumption. In this context, empirical research conducted in Poland—of which selected results are presented in this article—has the potential to significantly fill the knowledge gap by providing insights into which generations are most active in the phygital environment, which factors differentiate their behaviors, and how these findings can support the design of consumer experiences tailored to the specific characteristics of different age groups.

III. MATERIALS AND METHODS

In the study conducted by the authors, an online survey method was applied in February 2025 on a sample of 2,160 adult consumers from Poland. The sample was selected using a random-quota method, ensuring representativeness of the population with respect to gender, age, and size of place of residence. The survey was carried out with the support of the Ariadna Nationwide Research Panel (<https://panelariadna.pl/>).

The questionnaire consisted of 19 substantive questions and eight demographic questions. The substantive questions employed various types of scales: nominal, ordinal, and bipolar five- and seven-point scales, as well as closed-ended “cafeteria” questions. The reliability of the applied scales was assessed using Cronbach’s alpha, which fell within the acceptable range ($0.7 < \alpha < 0.9$), confirming their consistency and measurement validity.

The survey was preceded by pilot tests of the questionnaire to eliminate potential errors. Out of 39,997 invited individuals, 4,004 started filling out the survey, and after excluding incomplete responses and those inconsistent with demographic quotas, 2,160 respondents were included in the final analysis. The research sample provides results with a margin of error not exceeding 2%, at a confidence level of $\alpha = 0.95$. Its structure comprised adults representing four generations: Z, Y, X, and Baby Boomers, which enabled the analysis of generational differences in relation to phygital behaviors. Detailed characteristics of the research sample are presented in Table 1.

This article focuses on presenting selected results concerning the relationship between generational affiliation and consumers’ propensity toward phygital behaviors. Phygitality was measured using a bipolar seven-point scale (modeled on the Likert scale), referring to the frequency of using a smartphone to obtain information in everyday situations, with values ranging from -3 (never) to $+3$ (always).

Table 1. Study sample characteristics (N=2,160)

Specification		Number of observations	Percentage of observations
Gender	Female	1,149	53.2
	Male	1,011	46.8
Age	18–24 years	228	10.6
	25–34 years	312	14.4
	35–44 years	416	19.3
	45–54 years	357	16.5
	55 years and more	847	39.2
Generation	Z (18–24 years)	228	10.6
	Y (25–39 years)	519	24.0
	X (40–59 years)	792	36.7
	BB (60–80 years)	621	28.7
Education	Primary/lower secondary	58	2.7
	Basic vocational	217	10.0
	Secondary	918	42.5
	Higher	967	44.8
Economic activity	Secular work	1,316	60.9
	No secular work	844	39.1
Number of persons in the household	1	313	14.5
	2	785	36.3
	3	464	21.5
	4	395	18.3
	5 persons or more	203	9.4
Subjective assessment of the financial situation of one's own household	Very difficult	43	2.0
	Difficult	191	8.8
	Satisfying	786	36.4
	Good	845	39.1
	Very good	295	13.7
Place of residence by number of inhabitants	Rural	821	38.0
	Small-sized city (up to 20 K inhabitants)	277	12.8
	Medium-sized city (between 20 K and 99 K inhabitants)	445	20.6
	Big-sized city (between 100 K and 500 K inhabitants)	352	16.3
	Major city (over 500 K inhabitants)	265	12.3

IV. RESULT AND DISCUSSION

The analysis of the research results indicates that the majority of surveyed consumers demonstrate a positive attitude toward phygital behaviors, understood as the integration of physical and digital experiences in the purchasing decision-making process. The mean score in the sample was $M = 0.36$ ($SD = 1.46$), with as many as 63.1% of respondents obtaining a positive result (Table 2). Negative results (<0) were recorded among 25.3% of participants, while 11.6% showed neutral results. The distribution across specific intervals further indicates that the smallest percentage of respondents (4.3%) fell within the extreme range of the lowest scores (-3 ; -2), whereas the highest percentage (26.0%) was observed in the range ($+1$; $+2$).

The positive mean value suggests that, in general, Polish consumers are inclined to use mobile technologies in shopping situations. However, the high standard deviation reflects a significant heterogeneity of attitudes within the sample. Low skewness and kurtosis, in turn, suggest a relatively symmetrical distribution of results without clear extremes (Table 2).

Table 2. Descriptive statistics for phygital consumer (N=2,160)

Statistics	Mean	Median	Std. Deviation	Skewness	Kurtosis
Value	0.364	0.500	1.457	-0.687	0.232

The results of the correlation analyses indicate a statistically significant, though relatively weak, negative relationship between age and consumers' "phygitality." The Pearson linear correlation coefficient was -0.258 ($p < 0.001$). This suggests that younger individuals are more inclined to use mobile technologies and hybrid shopping channels. Fig. 1 presents the relationships between the age of Polish consumers and their propensity for phygital behaviors, as well as the fit of the results to various regression functions (linear, logarithmic, inverse, quadratic, and cubic).

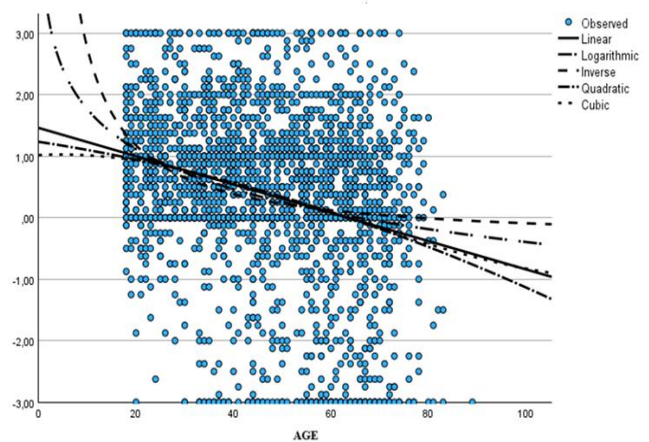


Fig. 1. Dependence of consumers' phygitality level on age (N = 2,160).

The information presented in Fig. 1 shows that all functions indicate the same general trend—the propensity for phygital behaviors decreases with age. The linear model best reflects this relationship and confirms a systematic decline in phygital propensity as consumer age increases. Nonlinear models, however, capture additional nuances: the logarithmic function suggests a sharper decline between the youngest and younger generations, followed by a gradual flattening; the inverse function indicates that in older age groups (BB, X), differences in phygitality levels become less pronounced; the quadratic function highlights the reduction of phygitality in middle-aged and older groups; while the cubic function additionally reveals greater stabilization of results among the youngest consumers, as well as increasing dispersion and a steeper decline in older groups. Comparing the different models allows for a more nuanced understanding of the relationship between age and phygitality, particularly in terms of intra-generational variation.

The analysis of generational differences using the Brown–Forsythe test confirmed statistically significant variation in the level of phygitality among groups ($F(3; 1899.2) = 48.09$, $p < 0.001$, $\eta^2 = 0.057$). The Games–Howell post hoc test showed that all generations differ significantly from each other, with the largest gap observed between Generation Z and Baby Boomers (mean phygitality: 0.95 vs. -0.10) (Table 3).

Table 3. Descriptive statistics for “phygital consumer” by generations (N=2,160)

Generation	N	Mean	Median	SD	Skewness	Kurtosis
Z	228	0.951	1.000	1.101	-0.234	0.383
Y	519	0.666	0.750	1.250	-0.828	1.399
X	792	0.363	0.500	1.449	-0.664	0.220
BB	621	-0.101	0.125	1.594	-0.435	-0.600

Table 3 clearly shows that Generation Z demonstrates the highest propensity for phygital behaviors ($M = 0.95$, $SD = 1.10$), Generation Y slightly lower ($M = 0.67$, $SD = 1.25$), Generation X moderate ($M = 0.36$, $SD = 1.45$), while Baby Boomers score negative values ($M = -0.10$, $SD = 1.59$). These results unambiguously indicate that younger generations are more inclined to integrate digital and physical experiences in their purchasing decision-making, whereas older generations exhibit a pronounced reluctance to adopt mobile technologies and hybrid shopping tools. However, the coefficient of determination $R^2 = 0.067$ (for both linear and nonlinear functions) suggests that age explains only 6.7% of the variance in phygitality, implying that other factors—such as purchase enjoyment, emotional engagement, convenience, or safety—play a significant role in shaping phygital behaviors.

The results align with and expand on previous research on consumer behavior in the phygital environment. The analysis can be framed within the typology of phygital consumers presented in another article by the authors (Maciejewski & Wróblewski, 2025). That study distinguished and described three core groups of consumers: “phygital integrators,” fully combining physical and digital experiences; “digital frequenters,” who prefer online solutions but also use physical channels; and “physical reality anchors,” for whom offline contact remains the foundation of the shopping experience. The present findings suggest that Generation Z largely consists of “integrators” and “frequenters,” while Baby Boomers are more often “physical reality anchors.” This indicates that generational differences can be effectively explained through the lens of phygital consumer typology.

From the perspective of this article’s objective, however, it is crucial to note that age or generational cohort is neither the only nor the most important differentiating factor. Another analysis conducted by the authors on the same sample of Polish consumers (factor analysis and SEM) (Wróblewski & Maciejewski, 2025, article under review) revealed four main factors influencing consumers’ propensity for phygital behaviors: purchase pragmatism, emotional engagement, convenience, and purchase enjoyment. Pragmatic consumers value digital tools for their ability to provide quick access to information and to compare offers, which confirms earlier findings on the effect of “mobile decision aid” (Grewal *et al.*, 2017; Shankar *et al.*, 2011; Flavián *et al.*, 2019). Likewise, purchase convenience—understood as ease, speed, and comfort of the process—encourages more frequent use of phygital solutions, consistent with research on customer experience (Jiang *et al.*, 2010, 2013; Verhoef *et al.*, 2015).

By contrast, emotional engagement exerts a different influence. The findings suggest that consumers seeking deep, relational experiences more often prefer offline environments,

where direct contact with the product, sales staff, and store atmosphere is possible (Jones *et al.*, 2006; Lemon & Verhoef, 2016). For these individuals—characteristic of older consumers (Baby Boomers and Generation X)—phygitality based on digital technologies may be perceived as limiting the authenticity and intensity of the experience.

The results also show that the strongest positive driver of phygital behaviors among younger groups (Generations Y and Z) is the hedonic factor. Consumers seeking pleasure and excitement appreciate the multisensory and interactive opportunities offered by AR, VR, and gamification (Arnold & Reynolds, 2003; Hilken *et al.*, 2017; Poushneh & Vasquez-Parraga, 2017; Javornik, 2016; Yim *et al.*, 2022). These consumers are the primary drivers of innovation in phygital shopping experiences.

In terms of generational differences, the results confirm that younger generations are more open to phygital experiences, both due to pragmatism and the pursuit of hedonic shopping values. Older generations, including Baby Boomers, demonstrate greater aversion to technology in the purchasing process and prefer physical experiences, underlining the need for tailored marketing strategies. For older consumers, building trust in online shopping is essential, particularly by ensuring transaction security, transparent information, technical support, and technological education. The literature highlights that loyalty programs, clear product information, and simple, intuitive interfaces can increase their engagement in the phygital environment (Maciejewski & Wróblewski, 2025; Wróblewski, 2025).

Overall, the discussion indicates that generational differences are visible and significant, but they do not fully explain the diversity of phygital consumers. Age is an important yet relatively weak predictor of behavior—motivational factors and belonging to one of the phygital consumer types play a much stronger role. In practice, this means that designing shopping experiences requires moving beyond simple demographic segmentation and incorporating more complex consumer profiles, including pragmatism, the need for convenience, emotionality, and hedonism. Effective marketing strategies should thus be based not only on generational segmentation but also on integrating demographic, psychographic, and behavioral approaches. This perspective better reflects the complexity of contemporary consumer behavior and enables the design of consistent shopping experiences that meet the needs of phygital integrators, digital frequenters, and physical reality anchors alike.

V. CONCLUSION

Based on the obtained research results in relation to the formulated research questions, it should be stated that:

- **RQ1.** The findings clearly confirm the existence of a relationship between age and the propensity of Polish consumers to engage in phygital behaviors. Correlation analyses revealed a statistically significant negative relationship between age and the level of phygitality ($r = -0.258$; $p < 0.001$), which means that the intensity of using solutions that combine physical and digital channels decreases with age. Generational comparisons showed significant differences among all four studied

consumer groups (BB, X, Y, Z).

- **RQ2.** Although age is an important differentiating factor, the results suggest that it is not the most decisive one. The coefficient of determination $R^2 = 0.067$ indicates that age explains only 6.7% of the variability in phygital behaviors. Thus, it can be assumed with high probability that there are factors exerting a stronger influence than age on consumers' propensity for such behaviors.

The research results presented in the article make a significant contribution both to the literature and to management practice. From a theoretical perspective, the article expands the current understanding of the phygital consumer, showing that while age is statistically significant, it explains only a small part of behavioral differentiation. This confirms the need for more multidimensional explanatory models in which factors such as pragmatism, comfort, emotional engagement, or shopping pleasure play an important role. This approach enriches the academic discussion on consumer segmentation, shifting the emphasis from traditional demographic variables toward motivations and styles of technology usage.

From a practical perspective, the results provide guidelines for managers designing shopping experiences in the phygital environment. They show that younger generations naturally adapt digital technologies, while older groups require special attention—particularly in terms of building trust, ease of use, and technological education. This means that effective market strategies should take into account the needs of both phygital integrators and physical reality anchors, integrating different customer experience pathways. The identified factors differentiating phygital behaviors can also serve as a starting point for developing diagnostic tools that better align offers and communication channels with specific consumer profiles.

The study, however, has certain limitations. First, it was conducted solely on the Polish market, which limits the possibility of directly generalizing the findings to other cultural and economic contexts. Second, the analysis focused on age, leaving out other potentially relevant variables, such as place of residence, education, or income differences. Future research directions should therefore include both deeper exploration of demographic and psychographic factors, as well as comparative analyses across different countries and cultures, which would make it possible to better capture both universal and contextual determinants of phygital behaviors. It is also worth studying the dynamics of these behaviors over time, taking into account the development of new immersive technologies (AR, VR, AI) and the evolving expectations of consumers. A particularly promising area appears to be the analysis of the interaction between hedonic and pragmatic factors and the sense of trust and security in the phygital environment, which may in the future determine the strength and direction of further adoption of such solutions.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

G.M. and Ł.W. worked on Conceptualization; Ł.W. worked on data curation; G.M. and Ł.W. worked on formal analysis; G.M. worked on funding acquisition; Ł. W. worked on investigation; G. M. worked on methodology; G.M. worked on project administration; Ł.W. and G.M. worked on resources, G.M. worked on software; Ł.W. worked on supervision; Ł.W. worked on validation; G.M. and Ł.W. worked on visualization; G.M. wrote original draft; Ł.W. wrote—review and editing; both authors had approved the final version.

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REFERENCES

- Anwar, R. S., Ahmed, R. R., Streimikiene, D., Strielkowski, W., & Streimikis, J. 2025. Customer engagement, innovation, and sustainable consumption: Analyzing personalized, innovative, sustainable phygital products. *Journal of Innovation & Knowledge*, 10(1): Article 100642.
- Arnold, M. J., & Reynolds, K. E. 2003. Hedonic shopping motivations. *Journal of Retailing*, 79(2): 77–95.
- Babin, B. J., Darden, W. R., & Griffin, M. 1994. Work and/or fun: Measuring hedonic and utilitarian shopping value. *Journal of Consumer Research*, 20(4): 644–656.
- Batat, W. 2019. *Experiential marketing: Consumer behavior, customer experience and the 7Es*. London: Routledge.
- Batat, W. 2023. Experiential research as a methodological framework for studying consumer behaviors in phygital settings. *Qualitative Market Research*, 26(3): 269–277.
- Batat, W. 2022. What does phygital really mean? A conceptual introduction to the phygital customer experience (PH-CX) framework. *Journal of Strategic Marketing*, 32: 1220–1243.
- Batra, R., & Ahtola, O. T. 1991. Measuring the hedonic and utilitarian sources of consumer attitudes. *Marketing Letters*, 2(2): 159–170.
- Del Vecchio, P., Secundo, G., & Garzoni, A. 2023. Phygital technologies and environments for breakthrough innovation in customers' and citizens' journey: A critical literature review and future agenda. *Technological Forecasting and Social Change*, 189: 122342.
- Flavián, C., Ibáñez-Sánchez, S., & Orús, C. 2019a. Integrating virtual reality devices into the body: Effects of technological embodiment on customer engagement and behavioral intentions toward the destination. *Journal of Travel & Tourism Marketing*, 36(7): 847–863.
- Flavián, C., Ibáñez-Sánchez, S., & Orús, C. 2019b. The impact of virtual, augmented and mixed reality technologies on the customer experience. *Journal of Business Research*, 100: 547–560.
- Grewal, D., Roggeveen, A. L., & Nordfält, J. 2017. The future of retailing. *Journal of Retailing*, 93(1): 1–6.
- Hilken, T., Heller, J., Chylinski, M., Keeling, D. I., Mahr, D., & de Ruyter, K. 2018. Making omnichannel an augmented reality: The current and future state of the art. *Journal of Research in Interactive Marketing*, 12(4): 509–523.
- Hilken, T., de Ruyter, K., Chylinski, M., Mahr, D., & Keeling, D. I. 2017. Augmenting the eye of the beholder: Exploring the strategic potential of augmented reality to enhance online service experiences. *Journal of the Academy of Marketing Science*, 45(6): 884–905.

- Hirschman, E. C., & Holbrook, M. B. 1982. Hedonic consumption: Emerging concepts, methods and propositions. *Journal of Marketing*, 46(3): 92–101.
- Hsu, C.-L., & Chen, M.-C. 2018. How does gamification improve user experience? An empirical investigation on the antecedences and consequences of user experience and its mediating role. *Technological Forecasting and Social Change*, 132: 118–129.
- Javornik, A. 2016. ‘It’s an illusion, but it looks real!’ Consumer affective, cognitive and behavioural responses to augmented reality applications. *Journal of Marketing Management*, 32(9–10): 987–1011.
- Jiang, L., Hoegg, J., Dahl, D. W., & Chattopadhyay, A. 2010. The persuasive role of incidental similarity on attitudes and purchase intentions in a sales context. *Journal of Consumer Research*, 36(5): 778–791.
- Jiang, L., Yang, Z., & Jun, M. 2013. Measuring consumer perceptions of online shopping convenience. *Journal of Service Management*, 24(2): 191–214.
- Jones, M. A., Reynolds, K. E., & Arnold, M. J. 2006. Hedonic and utilitarian shopping value: Investigating differential effects on retail outcomes. *Journal of Business Research*, 59(9): 974–981.
- Kim, J., & Forsythe, S. 2008. Adoption of virtual try-on technology for online apparel shopping. *Journal of Interactive Marketing*, 22(2): 45–59.
- Krowicki, P., & Maciejewski, G. 2024. *Shopping centre marketing: Value creation and customer engagement*. London: Routledge; New York: Taylor & Francis Group.
- Lemon, K. N., & Verhoef, P. C. 2016. Understanding customer experience throughout the customer journey. *Journal of Marketing*, 80(6): 69–96.
- Maciejewski, G., Mokrysz, S., & Wróblewski, Ł. 2019. Segmentation of Coffee Consumers Using Sustainable Values: Cluster Analysis on the Polish Coffee Market. *Sustainability*, 11(3): 613.
- Maciejewski, G., Mokrysz, S., Wróblewski, Ł. 2020. Coffee Consumer Segmentation: Implications for Producers and Sellers. In W. Sroka (Eds) *Perspectives on Consumer Behaviour. Contributions to Management Science*. Cham: Springer.
- Maciejewski, G., & Wróblewski, Ł. 2025. A typology of consumers based on their phygital behaviors. *Sustainability*, 17(14): 6363.
- Mont, O., Lehner, M., & Dalhammar, C. 2022. Sustainable consumption through policy intervention—A review of research themes. *Frontiers in Sustainability*, 3: 921477.
- Pantano, E., & Gandini, A. 2017. Exploring the forms of sociality mediated by innovative technologies in retail settings. *Computers in Human Behavior*, 77: 367–373.
- Pantano, E., & Priporas, C. V. 2016. The effect of mobile retailing on consumers’ purchasing experiences: A dynamic perspective. *Computers in Human Behavior*, 61: 548–555.
- Pantano, E., & Viassone, M. 2015. Engaging consumers on new integrated multichannel retail settings: Challenges for retailers. *Journal of Retailing and Consumer Services*, 25: 106–114.
- Poushneh, A., & Vaquez-Parraga, A. Z. 2017. Discernible impact of augmented reality on retail customer’s experience, satisfaction and willingness to buy. *Journal of Retailing and Consumer Services*, 34: 229–234.
- Prahalad, C. K., & Ramaswamy, V. 2004. Co-creation experiences: The next practice in value creation. *Journal of Interactive Marketing*, 18(3): 5–14.
- Schürmann, C. L., Helinski, C., Koch, J., Westmattmann, D., & Schewe, G. 2023. Digital nudging to promote sustainable consumer behavior? An experimental analysis in online fashion retail. In *Proceedings of the ECIS 2023 Research Papers (Paper 335)*. Kristiansand, Norway: Association for Information Systems. Available: https://aisel.aisnet.org/ecis2023_rp/335. Accessed September 10, 2025.
- Shankar, V., Inman, J. J., Mantrala, M., Kelley, E., & Rizley, R. 2011. Innovations in shopper marketing: Current insights and future research issues. *Journal of Retailing*, 87: S29–S42.
- Stevenson, A. B., & Rieck, J. 2024. Investigating returns management across e-commerce sectors and countries: Trends, perspectives, and future research. *Logistics*, 8(3): 82.
- Verhoef, P. C., Kannan, P. K., & Inman, J. J. 2015. From multi-channel retailing to omni-channel retailing: Introduction to the special issue on multi-channel retailing. *Journal of Retailing*, 91(2): 174–181.
- Wróblewski, Ł. 2025. Phygital consumption of cultural services: segmenting consumers by purchase channel preferences. *Cultural Management: Science and Education*, 9(1): 31–48.
- Wróblewski, Ł., & Maciejewski, G. 2025. *Factors influencing consumer behavior in the phygital environment*. Research report, article under review.
- Yim, M. Y.-C., Chu, S.-C., & Sauer, P. L. 2022. Is augmented reality technology an effective tool for e-commerce? An interactivity and vividness perspective. *Journal of Interactive Marketing*, 39(1): 89–103.

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