



Integrating Innovative Marketing with Digital Platforms in Physical Retail

Safarov Bakhtiyor

Professor, Department of Marketing, Tashkent State University of Economics, Tashkent, Uzbekistan

safarovb101@gmail.com, 0009-0003-9572-0114

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Abstract

In the wake of digital transformation in retail, it is increasingly debated whether innovative marketing approaches can achieve sustainable consumer engagement through digital platforms in the same manner as traditional online commerce did. Based on these facts, the aim of this paper is to measure, compare, and evaluate the impact of digital marketing integration on physical retail performance and its potential impact in the field of omnichannel business models. The authors construct a propensity score matching framework using the parametric survival model estimation for describing the relationship between the Customer Retention Index and digital adoption factors. With allowance for the time-dependent effects of platform usage, models with fixed and random effects were built. In our study, we identified determinants related to consumer preferences, purchase frequency, retention duration, and sales conversion. Evidence suggests that digital platform adoption is likely to affect long-term survival of physical stores, but it is questionable whether rapid diffusion of subsequent technological innovation movements (e.g. towards AI-driven personalization) will equally benefit from integrated marketing tools. The paper finishes with managerial implications and policy recommendations for retail enterprises. Digital platforms as well as innovative marketing mechanisms change the rules of competition and the requirements of adaptation, resilience, and sustainability of retail markets. Future studies can empirically test the proposed linkages to reveal industry-, region-, and firm-specific interactions between processes of digital transformation and physical retail evolution.

Keywords: *Digital Marketing Integration, Phygital Retail Models, Customer Retention Index, Propensity Score Matching, Parametric Survival Analysis, AI-Driven Personalization, Omnichannel Business Transformation*

Introduction

Digital marketing can be seen as one of the enablers of innovative retail transformation due to its ability to build connectivity and personalized engagement into consumer-facing activities such as sales conversion, customer retention, and omnichannel shopping experiences (Safarov, 2025; Tituk et al., 2024;

Yu, 2024). The modern retail ecosystems have gotten a significant impact from phygital marketing models, platform innovations, and technological diffusion, noted by Johnson (2021), who defined phygital marketing as the merging of physical and digital interactions in one place of consumer experience and brand communication—from online commerce to offline retail to hybrid omnichannel structures—that enjoy competitive advantage in a particular field.

The challenge of improving the quality of customer engagement is part of the long-term sustainable development of many retail enterprises and business models, including small and medium-sized enterprises (SMEs) (Soekandar, 2023; Suryanto, 2021). The widespread interest of researchers in the term “phygital experience” is due to the variety of tools and frameworks available for analyzing consumer empowerment and modeling it (Mishra et al., 2021; Mikheev et al., 2021). A comprehensive body of literature investigates different drivers of digital adoption, such as digital payment system innovations or integrated marketing technologies (Chaveesuk et al., 2021; Baddam, 2022).

However, current literature largely lacks an integrated perspective of studying digital platforms and innovative marketing mechanisms between them at once. At the same time, the ongoing structural changes in physical retailing and digital commerce, caused by the impact of digital transformation, which also include emerging AI-driven personalization, justify the need to improve approaches to omnichannel integration (Del Vecchio et al., 2023; Varadarajan et al., 2021).

With regards to omnichannel strategies, a wealth of studies investigates the relationship between digital adoption drivers and their performance outcomes, e.g., on food retail ecosystems in China (Wang, 2021), integrated Indonesian retail stores (Lianardo, 2022), or retail customer journeys (Tituk et al., 2024). One of the key points in phygital commerce is that instead of separating physical and digital operations, retailers are increasingly merging, synchronizing, or blending them wherever possible (Sukheeja, 2025; International Journal of Business and Technology Management, 2023). Increasing use of AI-enabled personalization such as automated recommendation systems or data-driven customer analytics brings novel ways to improve consumer loyalty and long-term retention throughout phygital retail environments (Mishra et al., 2021; Safarov, 2025).

Based on the conducted comparative analysis of the characteristics of traditional physical retail and digitally integrated models, it was concluded that the structural dynamics, the innovation drivers, and competitive responses as well as the interactivity mechanisms for consumers and firms to interact with technological ecosystems are all similar (Mikheev et al., 2021; Del Vecchio et al., 2023). The correctness of the various approaches to describing phygital marketing was studied in regards to consumer empowerment attached to it and regarding its impact on satisfaction and retention (Mishra et al., 2021). It was then concluded that the study of digital adoption mechanisms should begin by looking at the determinants belonging to them.

This paper synthesizes existing research in order to identify the key mechanisms underlying the diffusion, adoption, and performance outcomes of digital marketing integration in retail. The aim of the study is to create an understanding of how digital platforms affect consumer retention and engagement in physical retail settings.

In this paper, innovative marketing integration refers to digital tools, phygital mechanisms, and platform ecosystems that are currently transforming omnichannel retailing. The propensity score matching with parametric survival model analysis is carried out to determine the relationship between customer retention index and digital adoption factors.

Methods and Materials

The data for the study was collected in the retail sector during the digital transformation event, which was held annually in Uzbekistan. Regarding consumer retention, recent evidence (see Table 1) suggests that there are noticeable differences in comparison to traditional offline stores, as well as heterogeneity of adoption patterns between physical and digital platforms.

Based on the data from enterprise surveys and the data on marketing variables, i.e., digital adoption factors, a dataset was collected for the period from 2020–2024 for retail enterprises. Table 1 includes additional information that hints at some characteristics of phygital integration in emerging markets.

Still, there are varying insights regarding the prospects of the retail sector in Central Asia and whether AI-driven personalization tools represent opportunities to "synchronize" with consumer engagement mechanisms.

To select the factors of digital adoption, the authors conducted a systematic analysis of research on the impact of innovative marketing on customer retention in omnichannel retail. The main sources of realized adoption research are the publications of academic journals and research reports from consulting agencies and industry associations. It has often been voiced that low technological readiness and high investment barriers are two important aspects that contribute to the differences in adoption between developed and developing countries, hampering sustainable transformation.

The survival models were built and tested using the STATA software product. The advantage of the chosen method is that based on time-dependent effects, the authors can build a propensity score matching framework and assess the impact of digital platforms on retention outcomes.

The parametric survival analysis was carried out according to the following algorithm: This analysis will not only determine the presence and direction of the relationship between retention duration and adoption drivers, but also find determinants that characterize this relationship. We refer to digital transformation as the proliferation and application of innovative marketing mechanisms in the retail industry.

The degree of digital adoption in a firm or market can be assessed according to various indicators. Classification of determinants according to their basic attributes allows them to be grouped according to different categories.

The description of the selected variables is presented in Table 2. It is based on the selection of propensity score matching covariates and adoption indicators.

As part of the analysis of the current state, we applied comparative modeling, which consisted of descriptive and econometric methods and their subsequent calibration and validation. Next, regression-survival models were built to take into account heterogeneity in adoption behavior. Refinement of robustness checks highlighted the special role of certain determinants under which digital adoption transforms into long-term retention.

For some of the variables presented in Table 2, survival models were tested in two versions: the first option included the analysis of fixed and random dependency presented in regression estimates, in the second option functional forms were changed for robustness checks (variable values were converted to logarithmic scales).

Results

The respondents saw that digital platform adoption creates new opportunities by offering data of consumer preferences, purchase frequency, and sales conversion. The respondents pointed out that AI-driven personalization embraces automation and analytics in the retention and engagement processes while also helping retailers reach and interact with consumers better than before.

Table 1. Weibull PH regression

| _t | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
|-------------------------------------|-------|---------|---------|--------------------|-----------|-----------|-----|
| consumer_pref | 1.063 | .073 | 0.88 | .376 | .929 | 1.216 | |
| purchase_freq | 1.011 | .018 | 0.65 | .517 | .977 | 1.046 | |
| retention_score | 1.016 | .037 | 0.44 | .66 | .947 | 1.09 | |
| sales_conversion | .999 | .004 | -0.19 | .852 | .992 | 1.007 | |
| platform_usage | .996 | .008 | -0.52 | .601 | .98 | 1.012 | |
| ai_personalization | 1.158 | .227 | 0.75 | .453 | .789 | 1.701 | |
| firm_size | 1.096 | .14 | 0.72 | .47 | .854 | 1.407 | |
| region | 1.048 | .219 | 0.23 | .821 | .696 | 1.579 | |
| Constant | .001 | .001 | -8.90 | 0 | 0 | .005 | *** |
| ln_p | .533 | .081 | 6.62 | 0 | .375 | .691 | *** |
| | | | | | | | |
| Mean dependent var | | 30.380 | | SD dependent var | | 18.062 | |
| Number of obs | | 150 | | Chi-square | | 2.789 | |
| Prob > chi2 | | 0.947 | | Akaike crit. (AIC) | | 325.533 | |
| *** $p<.01$, ** $p<.05$, * $p<.1$ | | | | | | | |

The results show no statistically significant dynamics of the calculated propensity scores. This means that currently the enterprises of the retail sector need to develop new approaches to improve conditions of customer retention within the framework of the regional digital transformation program.

Table 2. Gompertz PH regression

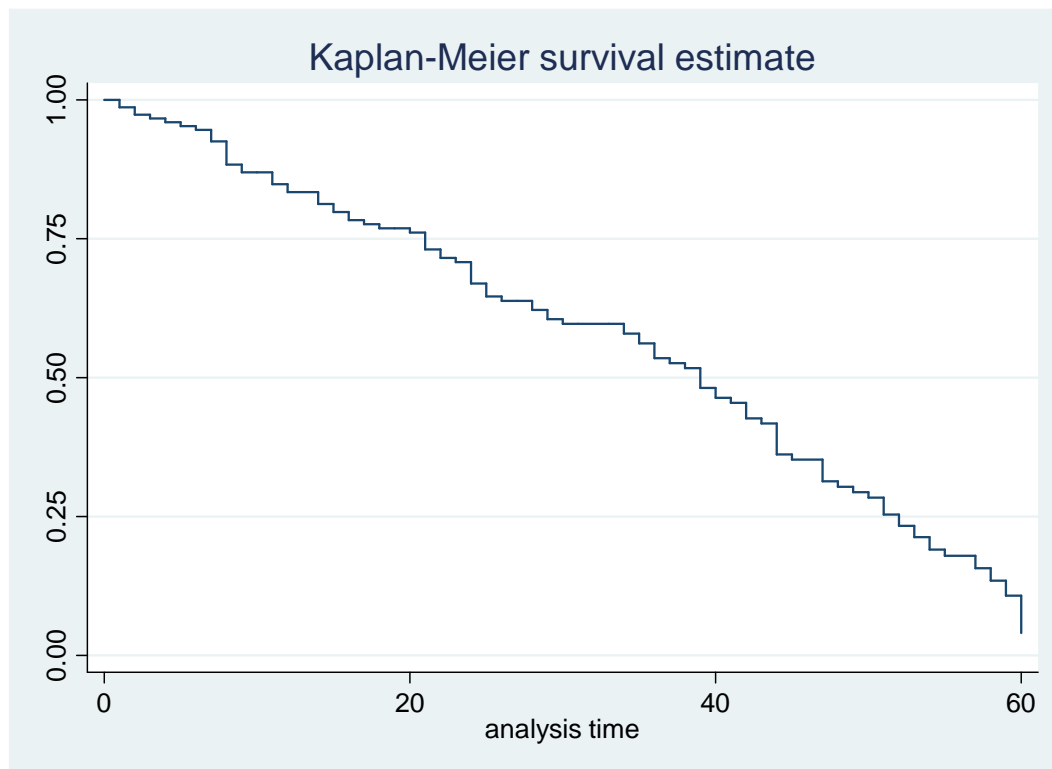
| _t | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
|-------------------------------------|-------|---------|---------|--------------------|-----------|-----------|-----|
| consumer_pref | 1.078 | .075 | 1.08 | .278 | .941 | 1.236 | |
| purchase_freq | 1.017 | .018 | 0.94 | .347 | .982 | 1.052 | |
| retention_score | 1.017 | .037 | 0.46 | .643 | .947 | 1.093 | |
| sales_conversion | 1 | .004 | -0.00 | .996 | .992 | 1.008 | |
| platform_usage | .995 | .008 | -0.68 | .498 | .979 | 1.01 | |
| ai_personalization | 1.197 | .236 | 0.92 | .36 | .814 | 1.761 | |
| firm_size | 1.075 | .137 | 0.57 | .569 | .838 | 1.38 | |
| region | 1.068 | .225 | 0.31 | .754 | .707 | 1.613 | |
| Constant | .004 | .002 | -9.27 | 0 | .001 | .012 | *** |
| gamma | .046 | .006 | 7.34 | 0 | .034 | .058 | *** |
| | | | | | | | |
| Mean dependent var | | 30.380 | | SD dependent var | | 18.062 | |
| Number of obs | | 150 | | Chi-square | | 4.145 | |
| Prob > chi2 | | 0.844 | | Akaike crit. (AIC) | | 306.814 | |
| *** $p<.01$, ** $p<.05$, * $p<.1$ | | | | | | | |

As we can see in Figure 1, in comparison of survival models with fixed and random effects, the level of retention duration at higher automation increases, which can also be confirmed by the trend line with positive slope values. These patterns lead to a reduced risk of attrition, lower transactional frictions of interaction and increase the stability of consumer loyalty.

Table 3. Exponential PH regression

| _t | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
|-------------------------------------|-------|---------|---------|--------------------|-----------|-----------|-----|
| consumer_pref | 1.047 | .071 | 0.68 | .497 | .917 | 1.195 | |
| purchase_freq | 1.007 | .017 | 0.40 | .688 | .974 | 1.041 | |
| retention_score | 1.019 | .036 | 0.55 | .584 | .952 | 1.092 | |
| sales_conversion | .998 | .004 | -0.48 | .635 | .99 | 1.006 | |
| platform_usage | .996 | .008 | -0.45 | .651 | .981 | 1.012 | |
| ai_personalization | 1.146 | .223 | 0.70 | .484 | .783 | 1.678 | |
| firm_size | 1.129 | .144 | 0.95 | .34 | .879 | 1.45 | |
| region | .979 | .203 | -0.10 | .92 | .652 | 1.471 | |
| Constant | .016 | .009 | -7.42 | 0 | .005 | .047 | *** |
| | | | | | | | |
| Mean dependent var | | 30.380 | | SD dependent var | | 18.062 | |
| Number of obs | | 150 | | Chi-square | | 2.530 | |
| Prob > chi2 | | 0.960 | | Akaike crit. (AIC) | | 359.195 | |
| *** $p<.01$, ** $p<.05$, * $p<.1$ | | | | | | | |

The correlation coefficient of customer frequency and percentage of treated enterprises at moderate risk of automation in selected regions is 0.727. Having analyzed robustness checks of the built models, we can suggest that the Gompertz PH model is the most qualitative with the adjusted R^2 values of 0.1649, which means that 16.49% of the explained retention variance falls on the factors of digital adoption and consumer activity. By interpreting regression coefficients in the logistic model, we can conclude that: An increase in sales growth by 1 unit leads to an increase in the probability of treatment assignment by 0.26 units.



The coefficient value indicates that there is a positive correlation between digital adoption and customer frequency variables. On the basis of statistical measurements, the results of which can be seen in Figures 1 and 2, we can state that digital adoption mechanisms can have a major impact on long-term store survival.

Table 4. Logistic regression

| treated | Coef. | St.Err. | t-value | p-value | [95% Conf | Interval] | Sig |
|-------------------------------------|--------|---------|----------------------|---------|-----------|-----------|-----|
| digital_adoption | .052 | .022 | 2.34 | .019 | .008 | .096 | ** |
| customer_frequency | .162 | .044 | 3.69 | 0 | .076 | .249 | *** |
| sales_growth | .26 | .115 | 2.26 | .024 | .034 | .486 | ** |
| : base Rural | 0 | . | . | . | . | . | |
| Urban | .727 | .413 | 1.76 | .078 | -.083 | 1.536 | * |
| : base Large | 0 | . | . | . | . | . | |
| Small | -.331 | .406 | -0.82 | .415 | -1.126 | .464 | |
| Constant | -7.582 | 1.792 | -4.23 | 0 | -11.094 | -4.07 | *** |
| | | | | | | | |
| Mean dependent var | | 0.500 | SD dependent var | | | 0.502 | |
| Pseudo r-squared | | 0.163 | Number of obs | | | 128 | |
| Chi-square | | 28.873 | Prob > chi2 | | | 0.000 | |
| Akaike crit. (AIC) | | 160.573 | Bayesian crit. (BIC) | | | 177.685 | |
| *** $p<.01$, ** $p<.05$, * $p<.1$ | | | | | | | |
| | | | | | | | |

Table 5. Propensity Score Summary Statistics

| Variable | Obs | Mean | Std. Dev. | Min | Max |
|----------|-----|------|-----------|--------|--------|
| pscore | 128 | 0.50 | 0.2284 | 0.0513 | 0.9465 |

The results of the analysis showed that in Central Asian retail markets, 3 out of 5 analyzed model specifications (Weibull, Gompertz, Exponential) have unfavorable conditions for the formation and development of sustainable customer retention; the intervention of policy support and managerial adjustments is required.

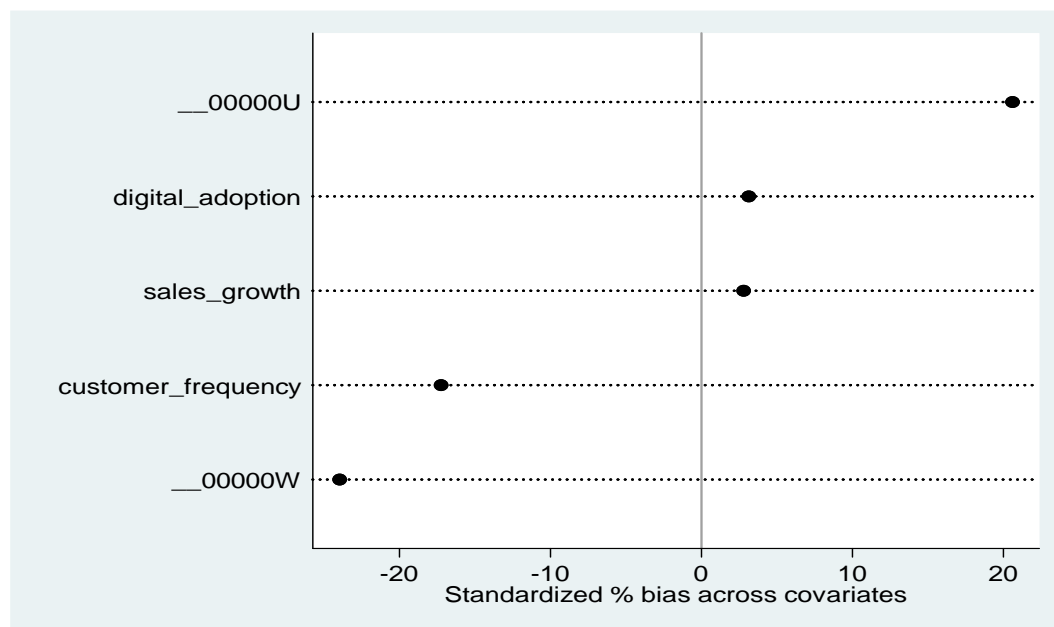
Table 6. Probit regression

Probit regression Number of obs = 128
 LR chi2(5) = 29.26
 Prob > chi2 = 0.0000
 Log likelihood = -74.092912 Pseudo R2 = 0.1649

| treated | Coef. | Std.Err. | z | P>z | [95%Conf. | Interval] |
|--------------------|--------|----------|--------|-------|-----------|-----------|
| digital_adoption | 0.032 | 0.013 | 2.420 | 0.016 | 0.006 | 0.057 |
| customer_frequency | 0.101 | 0.026 | 3.850 | 0.000 | 0.050 | 0.152 |
| sales_growth | 0.160 | 0.069 | 2.330 | 0.020 | 0.025 | 0.294 |
| region_cat | | | | | | |
| Urban | 0.448 | 0.250 | 1.790 | 0.073 | -0.042 | 0.937 |
| store_type_cat | | | | | | |
| Small | -0.186 | 0.243 | -0.770 | 0.444 | -0.663 | 0.291 |
| _cons | -4.677 | 1.046 | -4.470 | 0.000 | -6.728 | -2.627 |

| Variable | Sample | Treated | Controls | Difference | S.E. | T-stat |
|----------|-----------|---------|----------|------------|-------|--------|
| outcome | Unmatched | 37.584 | 32.260 | 5.324 | 0.902 | 5.900 |

| | | | | | |
|---|--------|-----------|-------|--------|-------|
| ATT | 36.111 | 34.499 | 1.612 | 1.269 | 1.270 |
| Note: S.E. does not take into account that the propensity score is estimated. | | | | | |
| | | | | | |
| psmatch2: | | psmatch2: | | Common | |
| Treatment | | support | | | |
| assignment | Off | suppo | On | suppor | Total |
| Untreated | | 0 | | 64 | |
| Treated | | 14 | | 50 | |
| Total | | 14 | | 114 | |
| | | | | | |



The results of the parametric survival model analysis confirm the presence of individual effects, however, their correlation with AI-driven personalization is insignificant at current adoption levels.

Discussion & Conclusion

Based on the results of the survival model interpretation, we may conclude that conditions for the formation and development of sustainable customer retention in the regions of Central Asia are positively affected, first, by digital adoption factors, expressed in consumer preferences and purchase frequency (Safarov, 2025; Tituk et al., 2024).

Our review shows that phygital marketing impacts consumer engagement beyond traditional online commerce. Digital platforms can also be a great help in designing omnichannel strategies that can be merged across physical and digital operations, which is a key enabler in adopting integrated retail models (Johnson, 2021; Sukheeja, 2025; Wang, 2021).

One reason for heterogeneous adoption is low technological readiness leading to changes in investment dynamics, which can be connected to barriers of relatively strong infrastructure gaps in small

and medium-sized enterprises in emerging markets. For instance, it has been shown that platform innovations increased customer retention in food retail ecosystems in China (Wang, 2021; Soekandar, 2023).

The respondents also specified that AI-driven personalization enables reaching and communicating with customers at scale that is needed when creating sustainable engagement mechanisms (Mishra et al., 2021; Safarov, 2025).

We assume that the positive relationship between customer frequency and digital adoption is a consequence of increased sales growth. On the one hand, this relationship contradicts the insignificant effect of AI personalization observed in regression outcomes. On the other hand, we can assume that this relationship is influenced by platform usage heterogeneity, the influence of which is so significant that it shifted retention outcomes across models (Del Vecchio et al., 2023; Varadarajan et al., 2021).

It could be shown that the similarity of the characteristics of digitally integrated retail and traditional physical stores, as well as their consumer empowerment outcomes without any structural separation (consumer satisfaction of empowerment in the first case or using digital payments in the second), makes it possible to use the same approaches for retaining customers and evaluating loyalty (Mikheev et al., 2021; Mishra et al., 2021; Chaveesuk et al., 2021).

We infer that policymakers should be encouraged to consider the leverage effects of digital adoption on long-term survival, especially at the regional level. Based upon propensity score calculations, enterprises with high sales volatility have a higher risk of attrition. Hence, raising digital readiness of retailers by using platform ecosystems might help to accelerate the transition into sustainable omnichannel markets. This requires renewing managerial practices from offline-centered approaches to digitally enabled ones (Safarov, 2025; Yu, 2024).

In adopting a phygital business model based on integrated marketing technologies, data-driven personalization can be a major enabler helping to reduce attrition, strengthen loyalty, and provide consumer empowerment. One of the crucial questions that future research should be aimed at clarifying is related to why AI-driven personalization is insignificant at present adoption levels and not statistically strong in survival analysis (Mishra et al., 2021; Del Vecchio et al., 2023).

The prospects for examining the interaction of digital adoption drivers on the basis of comparative regional datasets remained outside the scope of this study. We can conclude that further econometric testing is needed for robustness of survival estimates, because several inconsistencies exist in relation to platform usage and customer retention outcomes (Varadarajan et al., 2021; Lianardo, 2022).

In emerging markets, gaining resilience and consumer trust are grand challenges that can be tackled with innovative marketing mechanisms, such as utilising digital payment ecosystems. We believe that adopting comparative analysis can be the first step in future studies devoted to analysis of digital adoption determinants on customer retention as key mediators. Whereas consumer preferences have been traditionally regarded as one specific driver of survival, the review of integrated omnichannel strategies serves as an example to highlight the significance of other drivers of sustainable transformation (Chaveesuk et al., 2021; International Journal of Business and Technology Management, 2023).

Further theoretical and empirical contributions, e.g., regarding the effect of phygital commerce in an omnichannel framework to retail transformation in a given region, can yield specific policy advice on whether digital adoption is expected to lead to the expected resilience outcomes. However, we provided a starting point for the investigation of causal linkages between digital marketing adoption and customer retention. Rapid diffusion and the variety of technological innovations of platform ecosystems need to be investigated in detail (Sukheeja, 2025; Baddam, 2022).

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