

# A SYSTEMATIC REVIEW OF ONLINE MARKETING EFFECTS ON ONLINE AND OFFLINE SALES: A FRAMEWORK AND STATE OF RESEARCH

## SUSTAVNI PREGLED LITERATURE O UČINKU ONLINE MARKETINGA NA ONLINE I OFFLINE PRODAJU: OKVIR I TRENUTNO STANJE ISTRAŽIVANJA



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Review

Serhiy Bobrytsky<sup>a</sup>, Václav Strítěský<sup>b</sup>

<sup>a</sup>Prague University of Economics and Business, Faculty of Business Administration, Smržových 1047/8, 190 00, CZECH REPUBLIC, e-mail: bobs00@vse.cz

<sup>b</sup>Prague University of Economics and Business, Faculty of Business Administration, Winston Churchill 1938/4, 120 00, CZECH REPUBLIC, e-mail: vaclav.stritesky@vse.cz

### Abstract

**Purpose** – A significant body of literature has emerged over the past two decades on the effects of digital marketing on online and offline sales, giving rise to the pressing need to systematize the existing research and provide clarity on its various streams. Therefore, this systematic review has three main objectives: evaluating existing research, categorizing studies, and examining research methods.

**Design/Methodology/Approach** – This paper presents a systematic review of 89 articles on the effectiveness of online marketing instruments. The review follows the PRISMA methodology and utilizes the Python-based software ASReview.

**Findings and Implications** – The systematic review resulted in a categorization framework that classifies studies exploring the effectiveness of various online marketing instruments. Two major categories – own-channel advertising and cross-channel advertising – along with

### Sažetak

**Svrha** – Tijekom posljednja dva desetljeća pojavio se značajan korpus literature o učincima digitalnog marketinga na *online* i *offline* prodaju, što je zahtijevalo hitnu potrebu sistematiziranja postojećih istraživanja i razjašnjavanja različitih smjerova istraživanja. Stoga, sustavni pregled ima tri glavna cilja: evaluaciju postojećih istraživanja, kategorizaciju istraživanja i ispitivanje istraživačkih metoda.

**Metodološki pristup** – Članak pruža sustavni pregled 89 članaka o učinkovitosti instrumenata online marketinga. Primijenjena je metodologija PRISMA uz korištenje softvera ASReview koji se temelji na Pythonu.

**Rezultati i implikacije** – Sustavni pregled literature rezultira kategorizacijskim okvirom koji klasificira istraživanja o učinkovitosti različitih instrumenata online marketinga. Navedene su dvije glavne kategorije, tj. oglašavanje korištenjem vlastitog kanala i višekanalno oglašavanje, zajedno s njihovim potkategorijama. Rad također identificira uobičajene istraživačke metode (analizu podataka o pro-

their subcategories, are outlined. The study also identified common research methods (analysis of sales and advertising data, various experiments) and frequently used statistical techniques (Difference-in-Differences and Vector Autoregressive modeling, Structural Equation Modeling, Regression Analysis).

**Limitations** – Several limitations were encountered during this systematic review, including the inability to extract or access text from 61 articles, as well as potential language and publication bias as only English-language articles were included.

**Originality** – This systematic review is the first comprehensive examination of the impact of online advertising on online and offline sales, contributing significantly to the existing literature. It introduces an innovative framework for categorizing studies, highlights key limitations, identifies research gaps, and offers an extensive overview of statistical methods for future research in this area.

**Keywords** – online advertising, cross-channel, own-channel, online and offline sales, systematic review

daji i oglašavanju, razne eksperimente) te često korištene statističke tehnike (Difference-in-Differences i vektorsko autoregresivno modeliranje, modeliranje strukturnim jednadžbama, regresijsku analizu).

**Ograničenja** – Tijekom sustavnoga pregleda literature naišlo se na nekoliko ograničenja, uključujući nemogućnost izdvajanja ili pristupa tekstu iz 61 članka te potencijalnu pristranost u jeziku i publikacijama, jer su uključeni samo članci na engleskom jeziku.

**Doprinos** – Sustavni pregled literature prvo je sveobuhvatno ispitivanje učinaka online oglašavanja na online i offline prodaju koje značajno pridonosi postojećoj literaturi. Uveden je inovativni okvir za kategorizaciju istraživanja, naglašena su ključna ograničenja, identificirani nedostaci u istraživanjima. Rad nudi opsežan pregled statističkih metoda za buduća istraživanja u ovom području.

**Ključne riječi** – *online* oglašavanje, višekanalni pristup, vlastiti kanal, *online* i *offline* prodaja, sustavni pregled

## 1. INTRODUCTION

The last 20 years have seen a major shift in marketing spending worldwide. In 2019 companies spent 299 billion U.S. dollars globally on internet advertising, which is twice as much as the amount spent in 2015 (Wood, 2022). In 2021 the share of online advertising spending rose to more than 65% of overall investments made into marketing and was forecast to grow by 42% in the following 3 years (Statista, 2021).

Despite such dramatic growth in online marketing expenditures, many companies remain uncertain about the effectiveness of online advertising and struggle to measure its impact on company performance and value (Gaitniece, 2018). Marketing managers running online advertising campaigns aim not only to influence the online channel but also to drive offline sales in brick-and-mortar stores (Dinner, Heerde Van & Neslin, 2014). However, they face challenges in understanding the cross-channel effects of online advertising and often rely on a trial-and-error approach (Haan, Wiesel & Pauwels, 2015; Almeida, Filho, Limongi & Gomes, 2017). Additionally, many companies lack proper methodologies for evaluating the effectiveness of online campaigns on sales (Gaitniece, 2018). Lewis and Rao (2015) assert that most media agencies are unable to determine the effectiveness of the digital campaigns they conduct. These circumstances raise several critical questions: How to quantify the cross-channel impact of online advertising on both online and offline sales? What is the return on investment (ROI) of online advertising? Which online marketing tools deliver the most substantial cross-channel effects and ROI?

Given the increasing significance of online instruments, scholars and practitioners have attempted to address these questions using various research designs. Additionally, the topic was marked as one of the 2020-2022 research priorities by the Marketing Science Institute (Marketing Science Institute, 2020), which increased the volume of publications in recent years. Despite

the growing interest in the effectiveness of online instruments, extant knowledge in this area was not systematized and has only been mentioned in a few digital marketing reviews (e.g., Kannan & Li, 2017; Dwivedi, Ismagilova, Hughes, Carlson, Filieri, Jacobson, Jain, Karjaluoto, Kefi, Krishen, Kumar, Rahman, Raman, Rauschnabel, Rowley, Salo, Tran & Wang, 2021).

Hence, it becomes vital for both scholars and practitioners to have a systematic overview of knowledge regarding the effectiveness of online marketing instruments on both online and offline channels; existing streams in the research; methods, and techniques used by scholars to investigate those effects. This leads to the following research questions:

1. *What is the current state of the research investigating the effects of online marketing on online and offline sales?*
2. *What are the key streams in research on the effects of online marketing on online and offline sales?*
3. *What are the research methods and techniques used to evaluate the effects of online marketing on online and offline sales (Cross-channel)?*

To answer these questions, a systematic review of the academic literature regarding the effects of online marketing on sales was conducted. The relevance of this review relies on three aspects: First, to the best knowledge of the authors, an extensive systematic review of the body of knowledge on the effects of online marketing on sales is currently missing. Existing systematic reviews focusing on online marketing either just mention the existence of the topic or present a very basic overview.

Second, prior studies recognize two large streams of research of the effectiveness of online marketing instruments: own-channel advertising and cross-channel advertising (Dinner et al., 2014; online Kannan & Li, 2017). However, on a closer look, there are multiple sub-categories of research with specific characteristics that

need to be considered. Thus, the topic of the effectiveness of online marketing instruments requires a more comprehensive framework to guide scholars in future research.

Third, growing interest among scholars and practitioners in exploring the effectiveness of online marketing instruments resulted in an increase in publications over the last several years. The current research base allows us to conduct a systematic review aimed at helping scholars to understand the existing methods and results while also setting directions for further research.

In summary, this study provides a significant contribution to the literature by presenting a systematic overview of empirical and theoretical research, a categorization framework for analyzing the effects of online marketing on both online and offline sales. It identifies research gaps and methodological limitations while providing insights for future studies, thus advancing understanding in the field of digital marketing and its impact on online and offline sales.

To ensure transparency and maximize the efficacy of the review, the authors followed the “Preferred Reporting Items for Systematic Reviews and Meta-Analyses” (PRISMA statement) checklist and flow diagram (Page, McKenzie, Bossuyt, Boutron, Hoffmann, Mulrow, Shamseer, Tetzlaff, Akl, Brennan, Chou, Glanville, Grimshaw, Hróbjartsson, Lalu, Li, Loder, Mayo-Wilson, McDonald, McGuinness, Stewart, Thomas, Tricco, Welch, Whiting & Moher, 2021). Moreover, the authors employed an innovative Python-based software named ASReview, developed at Utrecht University to manage a large volume of academic papers effectively and ensure complete reporting (Van De Schoot, De Bruin, Schram, Zahedi, De Boer, Weijdema, Kramer, Huijts, Hoogerwerf, Ferdinands, Harke-ma, Willemsen, Ma, Fang, Hindriks, Tummers & Oberski, 2021).

The remaining sections of this article are organized as follows: Section 2 outlines the systematic review strategy and details the selection process. In Section 3, the authors present the

results of the systematic review, describing the current state of research, introducing a categorization framework for identified studies, as well as summarizing the research and the statistical methods used. Finally, in the conclusion they identify research gaps, discussing both implications for theory and practice, and providing an agenda for future research.

## 2. RESEARCH STRATEGY

### 2.1. Systematic review transparency and replicability

This systematic review follows replicable and transparent steps which are based on the PRISMA methodology (Sauer & Seuring, 2023) but related guidance is scattered across a number of core references and is overly centered on the design and conduct of the SLR, while failing to guide researchers in crafting and presenting their findings in an impactful way. This paper offers an integrative review of the widely applied and most recent SLR guidelines in the management domain. The paper adopts a well-established six-step SLR process and refines it by sub-dividing the steps into 14 distinct decisions: (1. The PRISMA flow diagram, depicting the flow of information through different phases of a review (Page et al., 2021), is presented in section “2.4 Study selection and extraction”.

### 2.2. Research eligibility criteria

*Topic of studies* – records should contain at least one of the following digital marketing terms: *display ads, banner ads, social media, paid search, search advertising, internet marketing, digital marketing, online advertising*; and sales terms: *sales, online sales, offline sales, performance, effectiveness* in their title and/or abstract.

*Study design* – both empirical and non-empirical studies are eligible. Even though most of the studies are empirical, it is important to include non-empirical studies, such as theoretical reviews, conceptual frameworks, and expert opinions. Non-empirical studies contribute valuable

conceptual understanding and insights that can support the interpretation of the results. The authors included all types of research design in the review, as one of the research questions is focused on systematizing the methods and techniques used to evaluate the effects of online marketing on sales.

*Language* – only English-written articles were included in the review; such a decision is associated with the high costs required for professional translation services and difficulty with replicability (Rockliffe, 2022).

*Publication status* – only international peer-reviewed journal articles with citations were included in this review.

*Year of publication* – the records between 2002 and 2023 were selected, as 2002 is the year of publication of the first relevant articles on the topic authored by Dube, Manchanda, Goh, and Chintagunta (2002).

### 2.3. Search strategy

Studies for inclusion in the review were identified using three research strategy. First, search for relevant articles in electronic databases Web of Science and Google Scholar using the following keywords and their combinations: “effects,” “sales,” “online sales,” “offline sales,” “display ads,” “banner ads,” “social media,” “paid search,” “search advertising,” “internet marketing,” “digital marketing,” “online advertising,” “cross-channel,” and “multichannel”. In total, 3,622 records were identified – 2,102 through Web of Science, and 1,520 through Google Scholar. The last search was run on 28 July 2023.

Second, search for articles in systematic reviews and perspective papers dedicated to digital marketing. The authors reviewed both older articles, dating to the time when digital marketing just started to accelerate (e.g., Winer, 2009; Ratliff & Rubinfeld, 2010) and the most recent studies, providing a rich overview of digital marketing state-of-the-art (including Kannan, Reinartz & Verhoef, 2016; Kannan & Li, 2017; and Dwivedi et al., 2021). A total of 32 articles were identified.

Third, search for articles using the ancestry approach, which involves an examination of the reference lists of identified articles in steps 1 and 2. The authors always started the review with the most recently published articles (Certo, Lester, Dalton & Dalton, 2006). For example, examination of the fundamental article authored by Dinner et al. (2014) online detected prior studies focusing on synergies between online and traditional media (Trusov, Bucklin & Pauwels, 2009; Wiesel, Pauwels & Arts, 2011) a small- to medium-sized enterprise in the business-to-business sector, desired a more analytic approach to allocate marketing resources across communication activities and channels. We developed a conceptual framework and econometric model to empirically investigate (1, while in another article (Haan et al., 2015), the author found studies which investigated the effectiveness of online ads on offline sales (Agarwal, Hosanagar & Smith, 2011; Skiera & Abou Nabout, 2013). A total of 19 articles were identified.

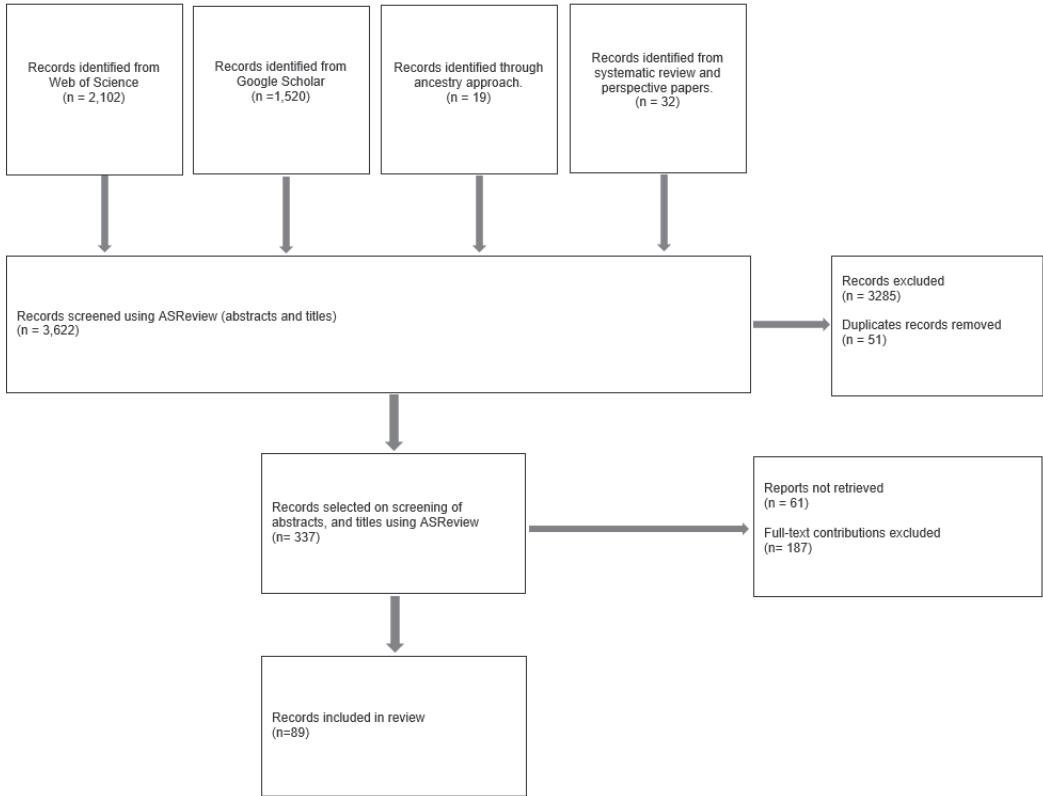
### 2.4. Study selection and extraction

Throughout the collection process described above, 3,673 records in total were identified. Several steps were taken to select relevant articles. First, the duplicates across all the records were removed. Second, all the records, containing titles, abstracts, authors, and publication years, were input into Python-based software ASReview. The software employs active learning techniques to support the systematic screening of large volumes of text (Van De Schoot et al., 2021). Using ASReview, the titles and abstracts of all the records were reviewed to identify potentially relevant articles. This step resulted in the identification of 337 potentially relevant articles. Third, a full-text search and additional review of articles were carried out. Most articles were accessed and extracted from EBSCO, Elsevier, and ResearchGate databases. However, full text of 61 articles could not be extracted or accessed. For the remaining 276 articles, full text was extracted and an additional review conducted, whereas 187 articles were found not to be relevant. These exclusions included studies primarily ad-

addressing technical aspects or features of digital marketing instruments, regulatory issues related to digital marketing tools, as well as bachelor or master theses. The selection and extraction process resulted in 89 articles included in the systematic review. The complete selection process is reported using the PRISMA flow diagram in Figure 1.

published. In total, 89 articles were distributed across 39 different journals. Notably, the *Journal of Marketing Research*, *International Journal of Research in Marketing*, and *Marketing Science Journal* contributed the highest number of articles to this systematic review. While most of the articles (50) were published in journals with a focus on Marketing and Advertising topics, oth-

FIGURE 1: Steps of the article selection process (PRISMA flow diagram)



Source: Authors' research.

### 3. RESULTS OF THE SYSTEMATIC REVIEW

#### 3.1. Characteristics of records included in the systematic review

Table 1 provides an overview of the journals in which the articles reviewed in this study were

er articles were also found in journals focusing on Economics (9), Management (8), Retailing (3), and Business (3).

TABLE 1: Number of articles included in the literature review per journal

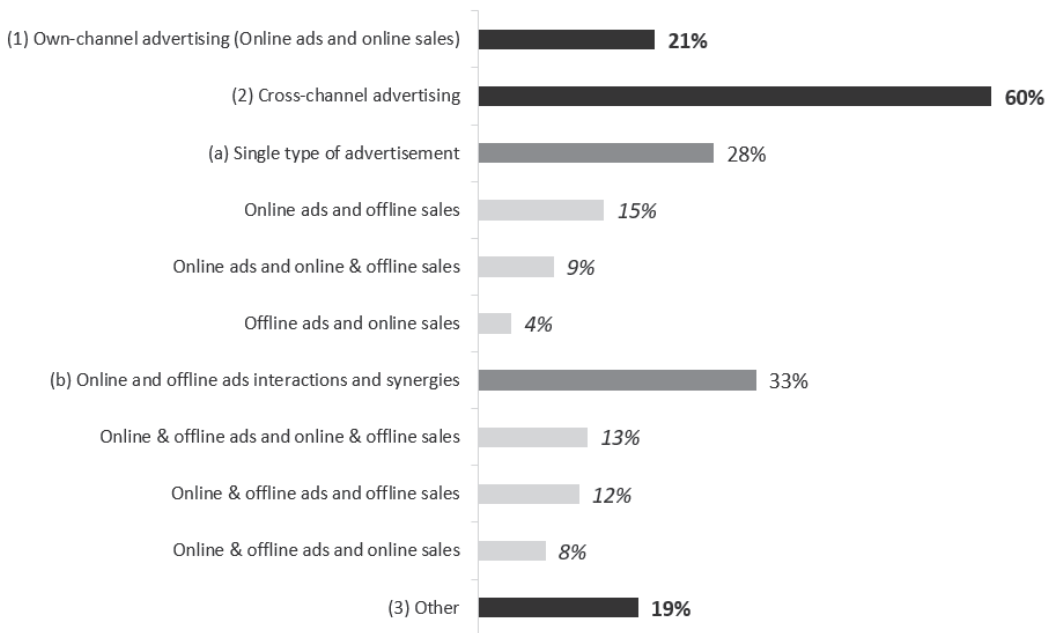
Publication name	Number of articles
Journal of Marketing Research	13
International Journal of Research in Marketing	11
Marketing Science Journal	10
Journal of Interactive Marketing	6
Quantitative Marketing and Economics	6
Journal of Advertising Research	3
Journal of Retailing	3
Management Science	2
Journal of Business Research	2
Marketing letters	2
MIS Quarterly	2
Journal of Advertising	2
Other Journals	27
<b>Total</b>	<b>89</b>

Source: Authors' research.

A breakdown of the articles, categorizing them based on specific topics and sub-topics addressed in this review, is reported in Figure 2. These articles are primarily grouped into three main clusters: own-channel advertising, cross-channel advertising, and other, with a further division by sub-categories. The detailed categorization and systematic review framework are presented in the next section.

In Figure 3, the evolution of research focusing on own-channel advertising (effects of online marketing on online sales) and cross-channel advertising is presented. From Figure 3 it is visible that most of the research base was developed between 2008 and 2021, as a result of rapid development and penetration of online marketing instruments. According to Wood (2022), global spending on paid search and social media ads has seen rapid growth since 2008. The same information is mentioned by Winer (2009) in his review; starting from 2006-2007 multiple corpo-

FIGURE 2: Breakdown of articles by topic included in the systematic review

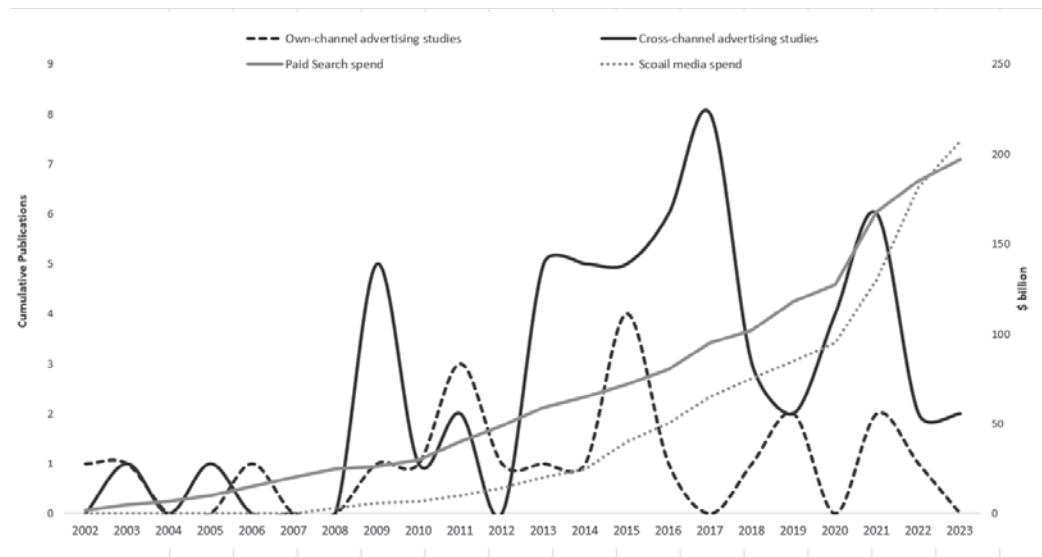


Source: Authors' research.

rations like Procter & Gamble started to switch their marketing budgets away from “old” to “new” digital media. For instance, in 2006 the US automobile industry shifted \$1 billion of marketing budget from traditional to online media (Winer, 2009).

line and traditional channels; 2) interaction of digital media (display, search, e-mail, affiliates, etc.) within the online environment and how they interact to acquire customers, create value, and build loyalty. Another example of categorization is provided in the study by Dinner et al.

FIGURE 3: Evolution of publications about online advertising effectiveness and global spending on paid search & social media



Source: Authors' research.

### 3.2. Categorization of studies investigating the effects of online advertisement on sales

Over the past two decades, research on the manner in which online marketing affects sales has grown significantly (See Figure 3). As more articles explore this topic and investigate various effects, there is a need for a framework to organize existing studies and provide guidelines for scholars. In the existing literature, there are two approaches to the categorization of studies investigating the effectiveness of online and offline advertising. In their systematic review, Kannan and Li (2017) propose to look at online media effectiveness from two perspectives: 1) interaction and synergies between on-

(2014)online, who organized research into two large groups: 1) Own-channel advertising effects and 2) Cross-channel advertising effects. The categorizations proposed by Kannan & Li (2017) and Dinner et al., (2014)online address certain aspects of the research but omit some significant elements. Those categorizations have been combined and enhanced here by adding new perspectives and subcategories. The refined theoretic framework is presented in Figure 4.

The divisions in the “Own-channel advertising” section have been introduced. This section now encompasses display ads, paid search, social media, and multiple forms of online advertising. The biggest changes have been implemented

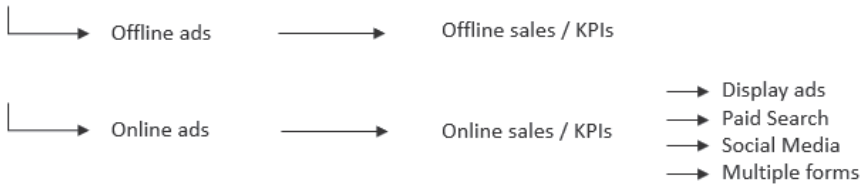


in the “Cross-channel advertising” segment, which has been split into two parts: a) single type of advertisement, and b) online and offline ads interactions and synergies. These modifications reflect the current state of the research. The concept of “synergy in online and traditional media” was introduced by Pauwels, Demirci, Yildirim & Srinivasan (2016b) and Schultz, Block & Raman (2012), as follows: “...*synergy in media arises when the combined effect of several media activities is greater than the sum of individual effects on sales...*” Furthermore, subdivisions have been made within a) a single type of advertisement, and b) online and offline ads interactions and synergies. Subdivisions within the single

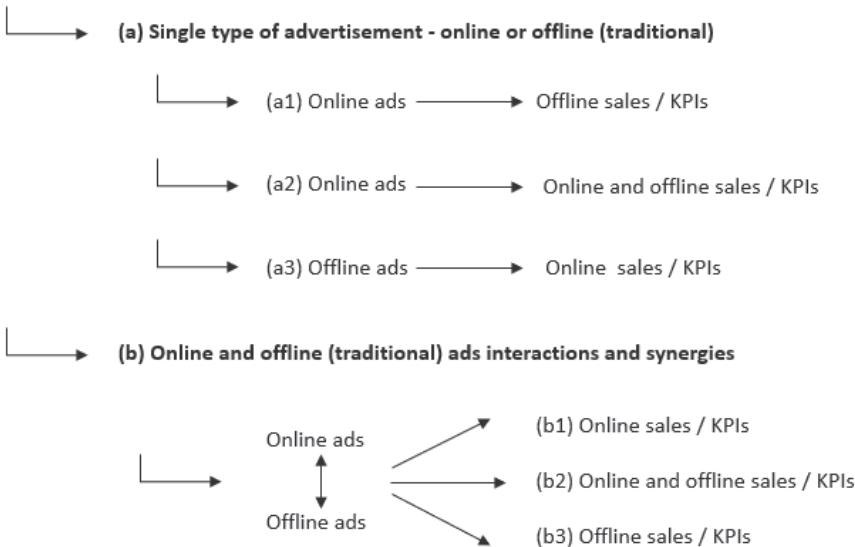
type of advertisement category include: a1) the effect of online ads on offline sales / KPIs; a2) the effects of online ads on both online and offline sales / KPIs; a3) the effects of offline ads on online sales / KPIs. In the context of interactions and synergies between online and offline ads, the subdivisions encompass: b1) the effect of online and offline (traditional) ads on online sales / KPIs; b2) the effect of online and offline (traditional) ads on both online and offline sales / KPIs; b3) effect of online and offline (traditional) ads on offline sales / KPIs. These enhancements and divisions are aimed at uncovering intra-group specifications and comparing them with other groups of studies.

FIGURE 4: Categorization framework for studies investigating the effectiveness of online and offline ads

**(1) Own-channel advertising**



**(2) Cross-channel advertising**



Source: Authors' research.

In Table 2, studies included in the review are categorized using the above-described framework (see Figure 4).

TABLE 2: Systematic review of effects of online marketing on offline and online brand performance.

Categories	Sub-categories	Resources
<b>Own-channel advertising</b>	Online ads online sales (or brand KPIs)	<ul style="list-style-type: none"> <li>▪ <b>Display ads:</b> (Dube, Manchanda, Goh &amp; Chintagunta, 2002); (Drèze &amp; Husserr, 2003); (Manchanda et al., 2006); (Rutz &amp; Bucklin, 2012); (Braun &amp; Moe, 2013); (Lambrecht &amp; Tucker, 2013); (Hoban &amp; Bucklin, 2015); (Lewis &amp; Nguyen, 2015); (Ghose &amp; Todri-Adamopoulos, 2016); (Xu et al., 2014); (Johnson et al., 2017)</li> <li>▪ <b>Paid Search:</b> (Ghose &amp; Yang, 2009); (Yang &amp; Ghose, 2010); (Agarwal et al., 2011); (Rutz et al., 2011); (Skiera &amp; Abou Nabout, 2013); (Blake et al., 2015).</li> <li>▪ <b>Social media:</b> (Sonnier et al., 2011); (Belanche et al., 2019); (Gordon et al., 2019); (Firman et al., 2021).</li> </ul>
	Offline ads offline sales (or brand KPIs)	<ul style="list-style-type: none"> <li>▪ Offline ads are not in the scope of this study</li> </ul>
<b>Cross-channel advertising</b>	<b>(a) Single type of advertisement</b> Online ads offline sales (or brand KPIs)	<ul style="list-style-type: none"> <li>▪ Website introduction (Pauwels et al., 2011)</li> <li>▪ Display ads (Lewis &amp; Reiley, 2014b)</li> <li>▪ Social media (Almeida et al., 2017)</li> <li>▪ Paid search (Kalyanam et al., 2018)</li> <li>▪ Social media (Štreimikienė et al., 2021)</li> </ul>
	Online ads offline & online sales	<ul style="list-style-type: none"> <li>▪ Display ads (Fulgoni &amp; Mörn, 2009)</li> <li>▪ Paid search &amp; value of a customer (Chan et al., 2011)</li> <li>▪ Display ads (Lewis &amp; Rao, 2015)</li> <li>▪ Display ads (Johnson, Lewis &amp; Nubbemeyer, 2017)</li> <li>▪ Mobile banner ads (Osinga et al., 2019)</li> </ul>
	Offline ads online sales (or brand KPIs)	<ul style="list-style-type: none"> <li>▪ TV ads &amp; online conversion (Guitart &amp; Hervet, 2017)</li> </ul>
	<b>(b) Online and offline (traditional) ads interactions and synergies</b> Online & offline ads offline sales or brand KPIs	<ul style="list-style-type: none"> <li>▪ ROI of multichannel communication (Briggs et al., 2005)</li> <li>▪ Blogging and TV (Onishi &amp; Manchanda, 2012)</li> <li>▪ Effectiveness of multimedia campaigns (Danaher &amp; Dagger, 2013)</li> <li>▪ Different forms of online &amp; offline ads (Hadadi &amp; Almsafir, 2014)</li> <li>▪ Consumer P2P online &amp; offline media (Srinivasan et al., 2016)</li> <li>▪ Online &amp; offline ads and firm value (Sridhar et al., 2016)</li> <li>▪ Display &amp; search ads and offline ads (Bayer et al., 2020)</li> </ul>
	Online & offline ads online sales or brand KPIs	<ul style="list-style-type: none"> <li>▪ Social media and traditional marketing (Trusov et al., 2009)</li> <li>▪ Online and offline earned media (Stephen &amp; Galak, 2012)</li> <li>▪ Paid Search in the multimedia campaign (Zenetti et al., 2014)</li> <li>▪ Different forms of online and offline ads (Haan et al., 2015)</li> </ul>
	Online & offline ads online & offline sales or brand KPIs	<ul style="list-style-type: none"> <li>▪ Display &amp; search vs traditional ads (Dinner et al., 2014)</li> <li>▪ Online-traditional synergies (Pauwels et al., 2015b)</li> <li>▪ Display ads and direct mailing (Lesscher et al., 2021)</li> <li>▪ Online vs. print media (Sridhar &amp; Sriram, 2015)</li> </ul>

Source: Authors' research.

### 3.3. Current state-of-the-art in research: Effects of online marketing on sales

#### 3.3.1. Own-channel advertising

The first group of studies focuses on **own-channel advertising effects**, where scholars investigate the relationships between *online advertising and online sales* (Dinner et al., 2014) *online*. Most of the studies in this area are primarily focused on measuring the effects of online advertising on changes in brand awareness, purchase intentions, brand attitudes, and sales.

In the area of **display advertising**, numerous studies (Dube et al., 2002; Manchanda et al., 2006; Hoban & Bucklin, 2015; Johnson, Lewis & Nubbemeyer, 2017; Rutz & Bucklin, 2012, Ghose & Todri-Adamoloulos, 2016; Lewis & Nguyen, 2015) highlight the effectiveness of display ads in increasing conversions, online revenues, repeat purchases, and positively impacting various stages of the shopper funnel. For example, Johnson et al. (2017) demonstrated the potential of display ads to boost site visits and conversions by 17% and 8%, respectively, with a lasting positive post-campaign effect; meanwhile, Ghose and Todri-Adamoloulos (2016) generalized the effectiveness of display advertising, finding that longer exposure increases direct search behavior and the propensity to make purchases.

Other studies (Drèze & Hussherr, 2003; Braun & Moe, 2013; Lambrecht & Tucker, 2013) focused on the causes of display ads effectiveness: creative variance in display ads content, personalization, and challenge with dynamic retargeted ads and conventional importance of click-through rates. Contradictory findings emerged from Xu, Duan, and Whinston (2014), whose simulation indicated display ads' low direct purchase impact but the potential for subsequent visits.

When it comes to **paid search**, extant studies (Ghose & Yang, 2009; Yang & Ghose, 2010; Agarwal et al., 2011; Bicen & Gudigantala, 2018) quantified the effects of search ads on consumer purchase behavior, established positive interdependencies between paid and organic search,

and concluded that paid search can boost click-through rates, conversion rates, and profit. For example, Bicen and Gudigantala (2018) showed that paid search was found to be eight times more effective in driving sales than social media. On the contrary, Blake, Nosko, and Tadelis (2015) introduced skepticism, indicating that brand keyword ads often lack measurable short-term benefits, challenging previous findings.

Research in the domain of **social media** advertising reveals its impact on consumer behavior. Sonnier, McAlister, and Rutz (2011) observe the considerable influence of social media communication on online daily sales. Gordon, Zettelmeyer, Bhargava, and Chapsky (2019) measured the causal effects of Facebook ads, underlining the potential of social media advertising. Additionally, Belanche, Cenjor, and Pérez-Rueda (2019) conducted a comparative study of Instagram and Facebook ads, concluding that Instagram ads positively influence consumer attitudes and increase perceived instructiveness. Firman, Ilyas, Reza, Lestari, and Putra (2021) further emphasized the constructive role of social media advertising by highlighting the positive impact of **influencer campaigns** on consumer confidence and purchasing intentions, although limited by sample size.

In conclusion, this research informs the evaluation of online marketing tool effectiveness on sales and behavior. While display and paid search ads consistently affect the online shopper funnel, the role of social media requires further exploration.

#### 3.3.2. Cross-channel advertising

The second group of studies focuses on **cross-channel advertising**, investigating either the relationships between *online advertising and offline sales* or relationships between *online, traditional advertising, and sales*. The first subgroup of cross-channel effects is **a single type of advertising**, where scholars tried to investigate the effects of different online instruments on offline sales. The most advanced research was conducted by Lewis and Reiley (2014b),

who conducted a randomized experiment with 1.6M customers of offline retailers, concluding that display ads have a positive effect on offline stores by bringing a 5% increase in sales.

The second subgroup is online and offline advertisement interactions and synergies, where scholars investigate the relationships between various traditional marketing channels (TV, billboards, radio, print, etc.) and digital marketing instruments, as well as their impact on online and offline sales, or brand performance.

With regard to **the effects of online and traditional advertisement on both online and offline sales**, research is focused on identifying intra- and cross-media synergies between different instruments. Several studies (Naik & Peters, 2009; Pauwels et al., 2016b; Pauwels, Aksehirlil, & Lackman, 2016a; Sridhar, Kumar & Bezawada, 2022; Lesscher et al., 2021; Lobschat, Osinga & Reinartz, 2017) found synergies between online advertising and traditional marketing on both online and offline sales. Naik & Peters (2009), Pauwels et al. (2016b), and Pauwels et al. (2016a) found synergies between paid search and traditional advertising such as TV, radio, and print. Lesscher et al. (2021) and Lobschat et al. (2017) found synergies between online banner advertising and media such as TV and direct mailing. Lobschat et al. (2017) concluded that banner advertising is the most suitable instrument for companies selling predominantly offline. The analysis of cross-media effects by Sridhar et al. (2022) revealed synergy effects between online emailing, catalogs, and TV, and radio. On the contrary, some authors found cannibalization effects or did not find any effect. The pioneers in this area Dinner et al. (2014) compared cross effects of display ads, paid search, and offline ads using data from a clothing retailer; they concluded that there is a cannibalization effect between traditional marketing (TV, radio, print, and billboards) and paid search, as offline ads decrease paid search click-through rates, reducing the cross effects of the campaign. Sridhar and Sriram (2015) built on to that research by identifying cannibalization between online and offline

advertising of newspapers. Meanwhile, Taylor, Kennedy, McDonald, Larginat, El Ouarzazi & Haddad (2013) did not find any synergy between TV and online advertising. One of the explanations for finding synergistic or cannibalization effects can be underspending or overspending on specific online or offline instruments. Kolarici & Vakratsas (2018) claimed that synergy is not de facto the outcome of cross-media advertising, with low-budgeted media playing a key role in producing interaction effects.

In the research focusing on the **effects of online and traditional advertisement on offline sales**, scholars used similar research designs and came to similar conclusions while focusing purely on offline sales. Kumar, Bezawada, Rishika, Janakiraman & Kannan (2016) found that a combination of social media, email advertising, and TV works synergically in impacting offline sales. On the other hand, Goldfarb & Tucker (2011) examined the effects of online advertising in states with and without bans on offline alcohol advertisements, finding that online ads can undermine offline advertising by acting as a substitute rather than a complement. However, it is important to note that disproportionately high substitutional effects of online advertising are valid mainly for new products with low awareness. Employing a unique approach, Sridhar et al. (2016) analyzed media effectiveness by dividing the campaign into three groups – regional advertising (local newspapers, local radio, local TV), national advertising (TV, radio, magazines, newspapers), and online advertising (search and display advertising). Using 12 years of data from 662 companies, the authors concluded that each type of advertisement had a positive and significant effect on offline firm performance; however, each advertisement type reduces the effectiveness of the other two respective types – a 1% increase in online advertising increases firm performance by 0.32% but also decreases the effectiveness of national effectiveness by 0.15% and regional by 0.03%.

A study by van Ewijk, Stubbe, Gijsbrechts & Dekimpe (2021) investigated the effects of dis-

play ads alone and in combination with TV and print on sales, concluding that the effect of display ads on offline sales depends on the type of product (high vs. low involvement) and brand awareness of the product (known vs. unknown). Display ads are best used as a stand-alone medium for high-involvement utilitarian products but it is better to combine them with traditional media for hedonic products.

Several studies have examined **the effects of online and traditional advertising on online sales and brand performance**. Zenetti et al. (2014) found that paid search advertising significantly influences consumer metrics while negatively interacting with TV advertising. In contrast, display ads complement TV ads, enhancing their impact on shoppers. This suggests the need to consider the differing effects of various media when designing multimedia campaigns. Haan et al. (2015) investigated the effectiveness of different advertising forms on online sales, using aggregated online and offline advertising data to offer budget allocation recommendations. They found content-integrated advertising to be the most effective, followed by content-separated advertising, and firm-initiated ads.

In the online sales area, Jayson, Block & Chen (2018) came to similar conclusions as van Ewijk et al. (2021) and Kolsarici & Vakratsas (2018) from different sections. Online and offline media effectiveness was shaped by product type as well as by a balance in investment between those two. As the authors said, "When paid and owned media were working together synergistically, investment in television advertising tended to interact with consumer behavior in social media and the brand websites." Additionally, Trusov et al. (2009) and Stephen & Galak (2012) compared social media and traditional marketing, discovering that social media exhibits longer carryover effects and higher response elasticities from users due to its higher frequency of activities.

In summary, existing studies tried to investigate complex relationships between online and offline advertising, shedding light on their impact

on sales and brand performance. In each subgroup of studies, researchers consistently found evidence of both synergy effects and cannibalization effects. Several studies suggest that these effects varied depending on factors such as product types, levels of spending on different advertising instruments, product awareness levels, and product category, or industry. Thus, the outcomes of cross-channel advertising campaigns are influenced by a multitude of factors, including the nature of the product being marketed, the selection of online and traditional marketing instruments, as well as allocation of resources across various advertising channels.

### 3.4. Overview of research and statistical methods in cross-channel advertising research

With the growing number of publications and increasing interest in examining the cross-channel effects of online advertising, a range of approaches have been utilized to measure those effects. Understanding the most employed research methods and statistical techniques holds significant value for scholars pursuing further research in this field. In Table 3, authors list the most common statistical and research methods employed in the studies of online marketing cross-channel effects on sales. The table consists of four columns: the first column represents categories of studies aligned with a categorization framework, as depicted in Figure 4; the second column summarizes key research methods used in the studies; the third column lists statistical methods linked to research methods; and the last column lists studies identified during a systematic review representing each individual research and statistical method. When examining the research methods used for different categories of studies, the primary research method in most studies is the **analysis of sales and advertising data**, followed by various types of **experiments**. Nevertheless, several studies used **a questionnaire** or **qualitative survey** as their primary research method. In the case of analysis of sales and advertising data, scholars either received historical data from advertising

companies like Kantar, from brand manufacturers, retailers, marketplaces, or from different databases: Dube et al. (2002) – healthcare e-shop, Dinner et al. (2014) – clothing retailer, Haan et al. (2015) – European online retailer, Bayer et al. (2020) – Kantar media agency, etc. In the case of an experiment, some scholars (Fulgoni and Mörn, 2009) conducted it through tracking software, while others (e.g., Almeida et al., 2017) used changes in the intensity of campaigns for concrete retailer or brand, and others yet (Lewis and Reiley, 2014b; Lesscher et al., 2021) employed control and test groups. Another approach was taken, for example, by Hadadi & Almsafir (2014), Štreimikienė, Mikalauskienė, Sturienė & Kyriakopoulos (2021), who selected the questionnaire as their primary research method.

Regarding **statistical methods**, it is evident from the table that scholars within the same category of studies typically employ different statistical methods. However, several techniques are recurrently used to analyze the relationships between online advertisements and sales outcomes, including various regression analyses, the Difference-in-Difference (DID) method, Structural Equation Modeling (SEM), and the Vector Autoregressive (VAR) model.

**Regression analysis**, as a fundamental statistical tool, is extensively utilized to analyze the influence of online advertising on sales. Among the studies included in the systematic review, regression analysis emerged as the most frequently used method across all research categories. Various types of regression analysis, including Negative Binomial, the Fixed-effects panel, Linear, and Log-Log regression, were utilized. The predominant regression models employed were linear regressions and the log-log model. Linear regression models are often criticized for their inability to account for all observed and unobserved factors, and for being biased in estimating coefficients of advertising effectiveness (Sridhar et al., 2016). On the contrary, the log-log model is favored for its ability to interpret coefficients as elasticities (Dinner et al., 2014; Lovett, Peres & Xu, 2019).

Several scholars (Dinner et al., 2014; Bayer et al., 2020) highlight the importance of considering the carryover effects of advertising when employing different types of regression analysis. The carryover rate may vary across different media types (e.g., traditional, display, search) due to their distinct roles in the purchase process. To address this, AdStock, or goodwill, is utilized to account for the long-term effect of each advertising medium on the dependent variables.

### **The Difference-in-Differences (DID) model**

is frequently used to assess the causal impact of interventions, policies, or treatments over time. It helps mitigate potential biases that arise from unobserved confounding factors by comparing changes within and between groups (Bertrand, Duflo & Mullainathan, 2004). While the DID method has been utilized across various categories of studies, it is predominantly used with panel-structured data, such as individual sales data before and after advertising, enabling comparisons of pre- and post-launch engagement and sales. DID has been employed to leverage both experimental and non-experimental variations in ad exposure (Lewis & Reiley, 2014b; Bar-Gill & Reichman, 2021; Kumar et al., 2016). In the research, the DID method was applied to both weekly and quarterly data.

### **Structural Equation Modeling (SEM)**

is a statistical method that combines factor analysis and regression analysis to examine complex relationships among multiple variables. SEM is used to test and estimate causal relationships among latent (unobserved) variables and observed variables (Kline, 2023). SEM has been applied in several studies (Kwon & Lennon, 2009; Biyalogorsky & Naik, 2003; Méndez-Suárez & Monfort, 2020) to either observe multiple variables simultaneously (e.g., offline sales, online sales, and the number of orders placed) and investigate cannibalization effects between online and offline channels (Biyalogorsky & Naik, 2003), or else to treat observed variables as latent variables representing a broader conceptual domain (Méndez-Suárez & Monfort, 2020). For instance, the online advertising construct may

include five items: retargeting, YouTube, display, Facebook, and Twitter (X) ads. In these studies, the SEM method was predominantly applied to weekly data.

**Vector Autoregressive (VAR) modeling** is a statistical method used to analyze the dynamic relationships between multiple variables over time. In the context of advertising, VAR modeling involves modeling the interactions and interdependencies between advertising-related variables, such as advertising spending, sales, and consumer behavior. These models capture the lagged effects of past variable values on their current and future values, enabling marketers and researchers to understand how changes in one variable may influence others within the

advertising ecosystem (Lütkepohl, 2005). For instance, Srinivasan et al. (2016) employed the VAR model to investigate the dual causality among online consumer metrics (paid, owned, and earned) and traditional marketing mix components (price, distribution, TV advertising), alongside brand performance. Within this context, TV advertising might stimulate consumers to engage in paid search, driving brand performance as a result. Pauwels et al. (2016a) recommend employing this method with longitudinal time series data. Additionally, Trusov et al. (2009) suggest that VAR modeling facilitates consideration of the indirect effects of marketing actions. Notably, these studies predominantly applied VAR modeling to weekly data.

TABLE 3. Summary of research and statistical methods for cross-channel advertising effects

Categories	Research method	Statistical method	Study
<b>Single type of advertisement – online or offline (traditional)</b>			
Online ads on offline sales / KPIs	Analysis of sales and advertising data	(1) Multivariate Poisson-Lognormal mode	(Kim et al., 2020)
		(2) Regression Analysis	(Zhang et al., 2023)
		(3) Vector autoregressive modeling (VAR) and Granger Impulse Response Functions (GIRFs)	(Kim & Hanssens, 2017)
		(4) Mixed effects modelling	(Xie & Lee, 2015)
		(5) Two-stage least squares (2SLS)	(Lu et al., 2013)
(6) Individual level latent class analysis (LCA) and Vector Autoregressive model (VARX)		(Pauwels et al., 2011)	
(7) Negative Binominal regression		(Cheng et al., 2021),	
(8) Fixed-effects panel regression		(Kim & Jang, 2021)	
	Field experiment and survey	(1) Regression analysis	(Mochon et al., 2017)
		(2) Hierarchical Bayesian model, Markov chain Monte Carlo (MCMC) methodology, Return on Ad Spend (ROAS)	(Kalyanam et al., 2018)
	Field experiment	(1) Difference-in-Differences (DID) model	(Lewis & Reiley, 2014b)
		(2) Structural equation modeling (SEM)	(Kwon & Lennon, 2009)
		(3) Regression analysis	(Sahni, 2016)
	Quasi-experiment	(4) Difference-in-Differences (DID) model	(Bar-Gill & Reichman, 2021)
	Survey	(1) None	(Štreimikienė et al., 2021)

Categories	Research method	Statistical method	Study
Offline ads on online sales / KPIs	Analysis of sales and advertising data	(1) Difference-in-Differences (DID) model and Least Square Regression (2) Auto Regressive Distributed Lag (ARDL) (3) Maximum Likelihood Estimation (MLE) (4) Hierarchical Regression and Markov Chain Monte Carlo (MCMC)	(Lambert & Pregibon, 2008) (Guitart & Hervet, 2017) (Joo et al., 2016) (Fossen & Schweidel, 2017)
Online ads on online and offline sales / KPIs	Survey	(1) Decision tree model (C5.0 algorithm)	(Duchessi & Lauría, 2013)
	Analysis of sales and advertising data	(1) Descriptive Analysis (2) Structural equation modeling (SEM) (3) Markov chain Monte Carlo (MCMC) methodology (4) One-Way ANOVA (5) Tobit model and Elasticities analysis (6) VARX modeling (7) Baseline model	(Fulgoni & Mörn, 2009) (Biyalogorsky & Naik, 2003) (Chan et al., 2011) (Jansen & Clarke, 2017), (Danaher et al., 2020) (Goic et al., 2018) (Dai et al., 2022)
	Field experiment	(1) Regression analysis, t-statistics (2) Ordinary-least-squares (OLS) regression, Propensity score matching (PSM) and coarsened exact matching (CEM) (3) ANOVA and regression analysis	(Lewis & Rao, 2015) (Osinga et al., 2019) (Lewis & Reiley, 2014a)
<b>Online and offline (traditional) ads interactions and synergies</b>			
Online and offline ads on offline sales / KPIs	Analysis of sales and advertising data	(1) Adstock framework; Elasticity Analysis (2) Regression analysis (3) Auxiliary regression (4) Stochastic frontier (SF) model and Data Envelopment Analysis (5) Difference-in-Differences (DID) model, Treatment Effects (TE) model, Elasticity Analysis. (6) VAR and elasticity Analysis. (7) Type II Tobit model and log-log model	(van Ewijk et al., 2021) (Bayer et al., 2020) (Sridhar et al., 2016), (Bayer et al., 2020) (Pergelova et al., 2010) (Kumar et al., 2016) (Srinivasan et al., 2016) (Danaher & Dagger, 2013)
	Survey	(1) Confirmatory factor analysis, Regression analysis (2) Regression and correlation analysis	(Gruner et al., 2019) (Hadadi & Almsafir, 2014)



Categories	Research method	Statistical method	Study
Online and offline ads on online sales / KPIs	Analysis of sales and advertising data	(1) Ordinary-least-squares (OLS) regression, decision tree (CHAID), ridge regression, and K-means cluster analysis (2) Multivariate Autoregressive Double Poisson model (3) Log-log regression and fixed effects models (4) Probit model and elasticities analysis (5) VAR model	(Jayson et al., 2018)  (Stephen & Galak, 2012)  (Lovett et al., 2019) (Zenetti et al., 2014) (Haan et al., 2015), (Trusov et al., 2009) (Wang et al., 2015)
	Analysis of sales and advertising data and experiment	(1) Regression analysis	
	Randomized experiment	(1) Average Treatment Effect on the Treated (ATET) estimators.	(Johnson, Lewis, & Nubbemeyer, 2017)
Online and offline ads on online and offline sales / KPIs	Analysis of sales and advertising data	(1) Partial Least Squares Structural Equation Model (PLS-SEM) with maximum entropy (ME) bootstrap method (2) Unobserved Components techniques and cointegrated VAR analysis (3) Regression analysis (4) Multinomial probit framework (5) Short-term advertising strength (STAS) measure (6) Time-Series Multivariate Adaptive Regression Splines (TSMARS) (7) Seemingly unrelated regression (SUR) approach. (8) Descriptive statistical analysis (9) Hierarchical modeling and correlation matrix (10) Log-log model and three-stage least squares (3SLS) (11) Bayesian Vector Autoregressive (BVAR) model (12) Endogeneity and evolution tests, VAR, Vector autoregressive model, Vector error correction model, elasticities analysis, generalized impulse response function, forecast error variance decomposition.	(Méndez-Suárez & Monfort, 2020)  (Cain, 2022) (Lobschat et al., 2017) (Sridhar et al., 2022)  (Taylor et al., 2013)  (Kolarici & Vakratsas, 2018)  (Lee et al., 2023) (Sridhar & Sriram, 2015)  (Naik & Peters, 2009)  (Dinner et al., 2014)  (Pauwels et al., 2016b)  (Lesscher et al., 2021)
	Quasi-experiment and field experiment	(1) Vector Autoregressive (VAR) model	(Pauwels et al., 2016a)

Source: Authors' research.

## 4. CONCLUSION

This study provides a comprehensive overview of empirical and theoretical research in analyzing the effects of online marketing on online and offline sales. As a result of the systematic review, the authors listed an overview of key studies in the field which represents the current state of the research (see Table 2). The described studies contributed substantially to both theory and practice in showing the approaches for quantifying the effects of online marketing on offline and online sales. The authors summarized the most common methods and statistical techniques used in existing research (see Table 3). However, it is important to acknowledge limitations that were encountered during this systematic review, including an inability to access text from 61 articles and potential language and publication bias as only English-language articles were included.

### 4.1. Theoretical Implications

The systematic review introduces a comprehensive framework for categorizing studies that explore the effects of online marketing instruments. This framework can serve as a guide for future research in this area, helping scholars structure their studies and analyze findings more effectively. The review provides insights into the research methods and statistical techniques commonly employed in cross-channel advertising research. Scholars can build on these methodologies to design more robust experiments and analyses, enhancing the quality of their studies. This article highlights the importance of understanding synergies and cannibalization between various advertising instruments. This opens directions for further research into the complex interactions between online and offline advertising channels and their cumulative effects on sales.

### 4.2. Implications for practitioners

The systematic review highlights the effectiveness of various online marketing instruments on both online and offline sales. Marketers can leverage this knowledge to make more in-

formed decisions about their advertising strategies, budget allocation, and campaign optimization. The research classifies the studies that explore cross-channel advertising effects, shedding light on how different online and traditional advertising mediums can interact to impact sales. This provides marketers with insights into designing more effective cross-channel campaigns to maximize their impact on both online and offline sales. The need for better metrics to evaluate the effectiveness of online marketing campaigns has been emphasized. Beyond relying solely on click-through rates, marketers should consider brand equity measures, conversion rates, and other behavioral indicators to assess the true impact of their campaigns.

### 4.3. Agenda for future research

One of the contributions of this article is the identification of core limitations in recent research and the proposal of an agenda for future research. The main limitation common to all studies reviewed is the investigation of a limited number of online marketing tools or the aggregation of online marketing as a single variable, which prevents a nuanced understanding of its impact on sales. Additionally, diverse methodologies, the absence of important control variables (price, promotions, etc.), and omission of variations in product type, brand awareness, and level of investment in digital marketing instruments further complicate interpretation. The most significant research gap identified relates to the absence of studies quantifying the effects of paid search, display ads, and social media ads on both offline and online sales. Therefore, future researchers should aim to address this gap by focusing on the companies operating in both online and offline channels and having stable sales across different product categories to validate conclusions across diverse products, considering product type, awareness, and level of investments behind digital marketing instruments. The authors recommend focusing on three key areas for future research.

**Social media:** given the rapid growth in social media advertising spending, there is a pressing

need for research to expand our understanding of its effects on both online and offline sales. Key research questions include:

- How do influencer campaigns on various social media platforms impact cross-channel performance?
- What are the effects of advertising on platforms like Facebook, Instagram, and X on cross-channel performance?
- What are the effects of advertising on video-sharing platforms such as YouTube and TikTok on cross-channel performance?
- How does advertising on messaging platforms like Telegram, WhatsApp, and Viber affect online and offline sales?

**Methodology aspects:** research in cross-channel advertising often exhibits variability in data, variables, industries, and statistical methods, potentially leading to contradictory results. Future research can address this by:

- testing the effects of digital marketing instruments in companies devoid of traditional marketing advertisements (e.g., TV, billboards, catalogues) operating in both online and offline environments to enhance result precision and eliminate the need for controlling traditional marketing variables;

- conducting meta-analyses on studies utilizing the same set of digital marketing instruments to enhance generalizability;
- incorporating more control variables such as price promotions, competition activities, and industry-specific factors to better understand the effects of digital marketing;
- incorporating product type (high vs. low involvement) and awareness aspects in investigating the effects of digital marketing;
- explore the influence of industry/category aspects on the effectiveness of digital marketing instruments on sales.

**Synergy and cannibalization of digital marketing instruments:** while many scholars have explored limited combinations of digital marketing instruments, some tools remain overlooked. Future research should:

- include a broader array of digital marketing instruments (such as paid search, display ads, social media, and email marketing) and examine their interactions to identify synergy or cannibalization effects in cross-channel environments;
- explore if contradictory results regarding synergy and cannibalization are driven by characteristics of data, methods, intensity of media spending, or other factors.

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