

Field experiments in marketing research: a systematic methodological review

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Abstract

Purpose – The purpose of this study is to present a systematic methodological review of the application of field experiments in the domain of marketing research. By performing this study, the authors seek to offer necessary advice and suggestions to marketing scholars interested in the application of field experiments and to promote the adoption of field experiments as a preferred methodological choice among scholars in this domain.

Design/methodology/approach – A total of 315 field experiments published in the ten leading marketing journals in the past five decades were analyzed in this systematic methodological review. This study examines various aspects of field experiments, including the research profile of existing research, different trends and topics related to field experiments, choice of research questions, methods of observations, unobtrusive data collection, types of interventions and outcome variables.

Findings – This study identified various trends and topics, categories of manipulations, types of limitations and important considerations in designing field experiments and offered necessary advice on the future of field experiments in marketing research.

Research limitations/implications – This study provides a complete roadmap for future marketing scholars to adopt field studies in their research plans. The systematic summary of limitations and the checklist will be helpful for the researchers to design and execute field studies more effectively and efficiently.

Practical implications – This review study offers a complete roadmap for marketing scholars who are interested in adopting field experiments in their research projects. The discussion of trends and topics, manipulations, limitations, design considerations and checklist items for field experiments offers relevant insights to marketing scholars and may help them design and execute field experiments more effectively and efficiently.

Originality/value – To the best of the authors' knowledge, this study is the first of its kind to provide a comprehensive methodological review of field experiments published in leading marketing journals throughout the past five decades. This study makes novel and unique contributions to both theory and literature on field experiments in the marketing discipline.

Keywords Field experiment, Field study, Field research, Lab experiment, Methodological review

Paper type Research paper



1. Introduction

There has been discernable growth in field-experiment-based studies published in leading marketing journals in the recent past. A field experiment in marketing research refers to a research design that observes the actual behavior of consumers in their natural context (Nelson *et al.*, 2020). Furthermore, the research manipulates interventions that are assigned randomly to investigate consumer choices, preferences and behaviors in an unobtrusive setting (Gneezy, 2017). Field experiments enable scholars to study consumers in their natural settings and identify causal relationships by examining their actual behavior in real-world settings (Baldassarri and Abascal, 2017). For example, a field experiment conducted in a retail bank found an affirmative association between employee-displayed smiling and satisfaction among bank customers (Otterbring, 2017). Similarly, Kumar *et al.* (2013) studied selected ice cream consumers in their natural settings and traced their online word-of-mouth (WOM) promotion behavior. They found a cause-and-effect relationship between positive WOM and growth in sales and the growth of brand knowledge among consumers and also proposed a unique measure of social media return on investment and customer influence effect based on the field experiment results.

The prior literature argues that the field experiment is an alternative to a controlled experimental study, but there is much debate as to what constitutes a natural context and which elements of research design are exclusive to a field experiment as compared to experimental research (Viglia and Dolnicar, 2020). Gerber and Green (2012) argued that field experiments and lab experiments are not easily distinguished and proposed that there are varying degrees of “fieldness” in study design; a field experiment setting can overlap with that of a controlled experiment on certain dimensions, such as the selection of participants, treatments and intervention manipulations, as well as the physical settings in which the study takes place (Harrison and List, 2004; Morton and Williams, 2010). Although there is an intense debate on the similarities between field and lab experiments, one unique aspect of a field experiment is that consumers are not aware that they are being observed, and their behavior is, therefore, not influenced or altered because of consciousness of being observed.

Although there is no clear distinction between field and lab experiments, the relative advantages of field-based studies are well recognized. Prior literature highlights four key advantages of field-based studies over lab experiments. First, field-based research allows scholars to study the cause and effects in unobtrusive settings by designing different interventions. The measures are free from issues such as social desirability bias, conformity bias and descriptive norms (Baldassarri and Abascal, 2017). Second, the results obtained from a field experiment can not only contribute to the validation of existing theories but can also help in the development of new theories (Gneezy, 2017; Viglia and Dolnicar, 2020). For example, field experiments have suggested the customer influence effect model not only was a new measure for predicting the monetary value of WOM but also made a significant theoretical contribution to the theory of customer engagement and the customer lifetime value (Pansari and Kumar, 2017). Third, field experiments in the marketing domain can more accurately reveal how consumers behave, what influences their behavior and choices and how behavioral modification can have practical implications for the industry. Finally, the generalizability of field experiment findings is higher than that of controlled experiments, as the study is based on consumer behavior in natural settings (Anderson and Simester, 2004).

It has been suggested that the marketing discipline can benefit greatly from well-designed and well-executed field experiments. While there are clear advantages to conducting field experiments, these studies comprise only a small proportion of published studies in the marketing discipline. One key reason for this could be the various limitations

and challenges associated with carrying out field experiments. Scholars have identified a number of challenges in adopting this methodological design in the marketing context. First, it is frequently difficult to obtain consent from industry partners (Gneezy, 2017); even initial successes in this regard may fall through, as industry partners have been known to withdraw their consent at advanced stages of research, citing legal and privacy issues (Levitt and List, 2009). Second, field experiments involve time-consuming processes, and it is often difficult to design the study and plan the data collection (Charness *et al.*, 2013). Third, there is a high rate of failure in manipulating the interventions (Cuervo-Cazurra *et al.*, 2020; Lambrecht and Tucker, 2018); unlike in controlled experiments, researchers face difficulties in dealing with the dynamic and uncontrollable natural environment (Eden, 2017). Finally, field experiments are based on observed behavioral data and so are ill-equipped to examine the underlying psychological factors that shape the behavior (Simester, 2015).

While a shift toward field experimentation is evident in the leading marketing journals, scholars remain reluctant to conduct field experiments and continue to rely on lab experiments (Cialdini, 2009). In addition, the majority of published studies that contain field experiments have used these to supplement lab and online experiments rather than performing them independently (Pizzutti, Basso and Albornoz, 2016; Das *et al.*, 2020; Schlager, de Bellis and Hoegg, 2020; Estes and Streicher, 2021). We suspect that marketing scholars are averse to adopting field experiments because of the perceived difficulty of their design and implementation, and there are very few methodological papers that can provide guidelines on how to handle such challenges (Gneezy, 2017).

Against this backdrop, we carry out a systematic methodological review of field experiments published in the ten leading marketing journals with four key objectives. First, we aim to demonstrate the value and significance of field experiments in marketing research. Second, we attempt to outline the different types of field experiments available to marketing scholars, with an emphasis on strategies for choosing a suitable field experiment design. Third, we discuss common pitfalls and challenges faced by marketing scholars, such as issues in manipulating independent variables and different key limitations associated with the field experiment method, with the intention of guiding prospective researchers around these issues. Finally, we seek to offer various practical measures to help marketing scholars overcome the limitations of this methodology. Therefore, the present study attempts to update emerging methodological techniques for conducting field experiments in both digital and offline environments to promote the adoption of field experiments among future scholars who may be new to the methodology.

This paper is structured as follows. In Section 2, we provide a detailed definition of a field experiment, with emphasis on its characteristics and types. In Section 3, we explain the methodology adopted by the authors for this systematic methodological review and present the research profile of the studies reviewed, including the geographic representation, types of participants and data sources used in the field experiments. In Section 4, we discuss various trends and topics identified in the prior literature. Section 5 presents an in-depth discussion of different types of manipulations in the selected studies, and in Section 6, we discuss six different types of limitations associated with field experiments. Section 7 lays out important considerations in designing field experiments, and finally, Section 8 concludes with a discussion of the future of field experiments in marketing research.

2. Field experiments: characteristics and types

A field experiment is a special type of experimental study in which the researcher designs interventions in real-life settings and observes the natural behavior of participants (Viglia and Dolnicar, 2020). Field experiments offer scholars the opportunity to study subjects in

their natural environments, allowing them to track actual behavior in the real world to identify causal relationships (Baldassarri and Abascal, 2017). As Gneezy (2017) wrote on the topic of field experiments in marketing:

In field experiments, participants are unaware that they are taking part in a study – or, if they are aware, they are engaging in activities as they normally would, regardless of the experiment (p. 140).

We have compared field and lab experiments and survey research on five distinct characteristics – realism, generalizability, abstraction, obtrusiveness and precision (Table 1).

The characteristic of *realism* refers to how realistic the observed phenomenon is in the actual world. Field experiments score highest on the dimension of realism. The extent of a study's *generalizability* indicates whether the research findings are widely applicable to the entire population or are restricted to a sub-section. Field experiments have high external validity, and while they also score high on the parameter of generalizability, it is often expensive and time-consuming to attain a sample in field experiments that is sufficiently large to provide truly generalizable results. *Abstraction* references the study's scenario building. While lab experiments use abstract scenarios as experimental stimuli, field experiments and surveys can use highly concrete real-world scenarios. *Obtrusiveness* refers to whether study participants have their attention interrupted or guided during data collection. Field experiments are unobtrusive because researchers observe participants in their natural environment without interrupting them or drawing their attention during the study. Finally, the characteristic of *precision* refers to the ability of the researcher to control measurement errors and confounding factors that may influence the study outcome. Field experiments are low on precision relative to lab experiments.

According to the taxonomy of experiments presented by Harrison and List (2004), field experiments fall into three categories: artefactual field experiments, framed field experiments and natural field experiments (Table 2). Artefactual field experiments are similar to conventional lab experiments and are also referred to as “lab-in-the-field” studies (Bacile *et al.*, 2014; Czibor *et al.*, 2019). Artefactual field experiments are conducted in an artificial environment, but the study sample is drawn from the relevant populations; that is, the respondents are non-standard (non-student). For example, Bart *et al.* (2014) manipulated

Table 1.
Characteristics of
field experiments

Type of study	Realism	Generalizability	Abstraction	Obtrusiveness	Precision
<i>Field experiment</i>	High	High	Concrete	Unobtrusive	Low
<i>Lab experiment</i>	Low	Medium	Abstract	Obtrusive	High
<i>Survey</i>	Low	Low	Concrete	Obtrusive	Medium

Table 2.
Types of field
experiments

Characteristics	Artefactual field experiment	Framed field experiment	Natural field experiment
<i>Non-standard subjects</i>	Yes	Yes	Yes
<i>Context</i>	Controlled lab	Natural setting	Naturally occurring event
<i>Outcome</i>	Non-real	Non-real	Real behavior
<i>Degree of fieldness</i>	Low	Low	High
<i>Participant awareness</i>	Yes	Yes	No
<i>Researcher control</i>	High	Medium	Low
<i>Random treatment</i>	Yes	Yes	Yes

mobile display advertisements and observed how users interacted with mobile display advertising to measure users' attitudes toward products.

Framed field experiments draw a sample from the relevant population and the study is conducted in a natural environment, but the sampled subjects are aware of their participation (Böttger *et al.*, 2017; Czibor *et al.*, 2019; Grégoire and Mattila, 2021). For example, Chung and Narayandas (2017) manipulated sales compensation to observe the impact of sales compensation on sales force performance. In the mobile display advertisement study, although sample survey respondents were self-selected, the sales force in the later study was aware of the ongoing experiment in the organization. Therefore, both the artefactual field experiment and the framed field experiment are overt, and the study participants are aware of being a part of the study.

In contrast, natural field experiments are covert. Scholars observe sampled participants in their natural settings, and the participants are unaware of being studied or observed (Gneezy, 2017). For example, if a researcher wants to examine the impact of peer pressure on consumer decisions to purchase salient brands, then the intervention must be designed and implemented in the retail store (Otterbring, 2021). In addition to this classification of field experiments, our review revealed that the studies varied in their degree of fieldness based on the dependent variable used. For example, a field experiment with a follow-up survey measuring an outcome variable that is different from real-life behavior and using a latent construct (e.g. semi-behavioral variables such as attitude, preference and intention) is considered to have a low degree of fieldness relative to a field experiment in which actual behavior is observed as an outcome variable.

Field experiments are often used for two primary reasons. The first rationale is to establish causal relationships. According to List (2011), a field experiment is superior to other methods in marketing research because it allows causal inferences. Second, compared to lab-based experimental studies, field experiments have high ecological and external validity. Ecological validity is an indicator of the generalizability of findings to the real-world context, whereas external validity measures the generalizability of findings in other contexts. Hence, the findings of field experiments have immediate practical implications, and marketers can use them to design and implement marketing strategies. However, unlike in a lab experiment, the researcher in a field experiment lacks full control in manipulating and implementing the intervention resulting in, for example, compliance issues, deviation from the assigned task and self-selection, which may lower the internal validity of the findings. High internal validity rules out the possibility of an alternative explanation (i.e. confounding variables) of the cause-and-effect relationship established in the study.

In Table 2, we summarize and compare the key characteristics of three types of field experiments on the basis of subject, context, outcome measures and the tradeoff between the degree of fieldness, researcher control and random treatment. The naturalness of a field experiment increases from left to right, whereas the researcher's control over the experimental context reduces with an increase in naturalness.

3. Method

To achieve the objectives of this study, we performed a systematic methodological literature review (Aguinis *et al.*, 2020), which provides a systematic review of methodological issues, a summarization of the methods in prior literature and a set of methodological recommendations for future scholars (*ibid.*). In this study, we carried out systematic methodological literature review to summarize field experiments published in the marketing domain, with an emphasis on their methodological ingredients (e.g. sample size, nationality of sample, nature, number of studies, study participants, study design and observed

variables). Our review relies on information extracted from 315 research papers from ten leading peer-reviewed marketing journals. The period considered is from the journal's inception to February 2022.

First, we extracted publications from Elsevier's Scopus database. The Scopus database is a widespread, robust and convenient tool with numerous additional features that are not found in other databases, such as Web of Science or Google Scholar (Bosman *et al.*, 2006; Thüerer *et al.*, 2020). We selected marketing journals listed in the Financial Times 50 (FT-50) and journals ranked by the Chartered Association of Business Schools (ABS) (i.e. ABS4 and ABS4*, respectively). Because we targeted this systematic methodological review for the *European Journal of Marketing's* special issue of field studies, we also included the *European Journal of Marketing* in our search list. We adopted five inclusion and four exclusion criteria (Table 3).

The next step was to select keywords based on author and peer recommendations. As described in the study objective, the aim of this study is to review the existing literature relating to field experiments in the marketing domain. Therefore, we included all relevant studies by including relevant keywords, that is, "field study" and "field experiment", to capture all available studies. Because "field study" is a broad term that may include field studies with non-experimental research designs, we carefully excluded articles that used non-experimental designs. For substitutes and synonyms, we also "field research" in our keywords. In our search of the Scopus database, we applied a filter with these keywords in a title, abstract and keywords search. The process model of the study selection is presented in Figure 1.

We further used language as a filter and selected only those articles published in English, which returned 644 articles in the first round. For the second round of screening, we searched all 644 articles for references to field experiments in the abstract and methodology section. This round resulted in a total of 436 articles in which the field experiment is primarily discussed in the methodology section. Next, we performed a closer read of the methodology section of all 436 articles to identify suitable articles and finalize the sample for our review. We excluded studies that claimed to use field experiments in their methodology but used student participants as subjects, as such studies fail to qualify as "artefactual field experiments" because of their use of standard participants. At the end of this third round, we had shortlisted 315 research articles which then underwent a comprehensive analysis.

After taking stock of the 315 papers and laying out the future trajectory, we followed the recommended practices of Aguinis *et al.* (2020) to conduct this methodological literature review. As Aguinis *et al.* (2021) suggested, we offer an overview of the two methods, field study and field experiments, to ground our critical analysis of the work published to date

Inclusion criteria	Exclusion criteria
IC1. Articles from ten leading peer-reviewed journals in the marketing discipline	EC1. Articles from journals of other disciplines than marketing
IC2. Articles published from the first issue of each selected journal to February 2022	EC2. Articles focused on other types of experiments, such as laboratory, controlled and field studies with non-experimental design
IC3. Articles explicitly focusing on field experiments/ field study (with experimental design)	EC3. Articles in languages other than English
IC4. Articles in the English language	EC4. Reviews, commentaries and editorial notes
IC5. Empirical studies	

Table 3.
Inclusion and
exclusion criteria

Keywords	# of Articles
Field research	8
Field experiment	317
Field study	319

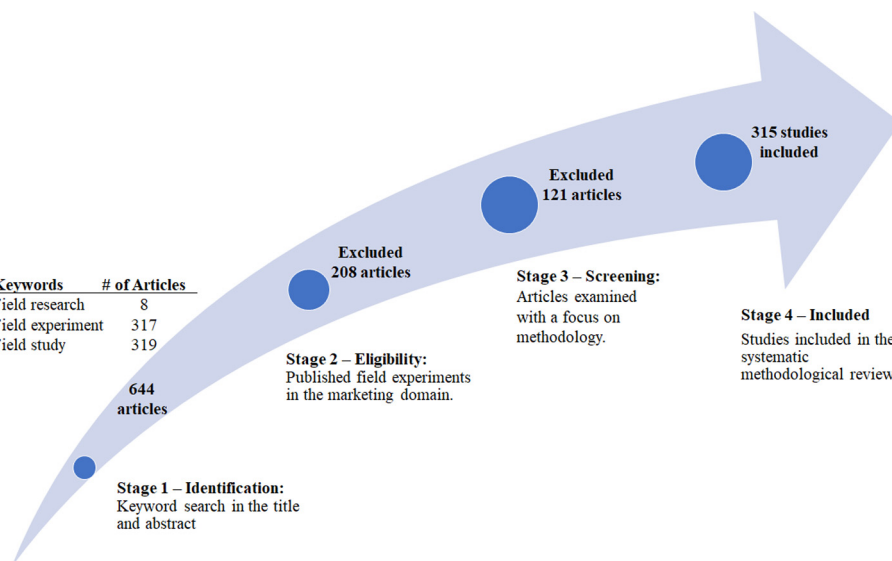


Figure 1.
Process model for selecting relevant studies

and to comprehensively examine the different research contents and themes of the articles reviewed. In cases of overlap in the keywords, we classified studies which used “field research” and “field experiment” as “field experiment” and studies which used “field study” and “field experiment” as “field experiment.” There were no studies that used both “field research” and “field study” as keywords.

3.1 Research profile

We examined the preferred methodological choices in articles published in the ten leading marketing journals since the inception of the journal until February 2022. The details of the journals selected are given in Table 4. We found that less than 2% of published articles reported the use of field experiments in at least one study per article (note that articles published in these journals report on multiple studies). The proportion of field experiments has increased marginally in the past 10 years (Table 4), but a few journals have witnessed a far steeper increase. For example, in the *Journal of Marketing*, 10% of studies published between 2011 and 2022 have included at least one field experiment per article. Similarly, approximately 6% of studies published in the *Journal of Academy of Marketing Science* and *Marketing Science* included field experiments during the same period. The reviewed data revealed that the *Journal of Marketing research* had published a total of 135 articles that reported field experiments in at least one study. *Journal of Marketing* stands second with 100 articles using field experiments in at least one study. *Marketing Science* and *Journal of Consumer research* ranked third and fourth with 81 and 80 articles based on field experiments, respectively.

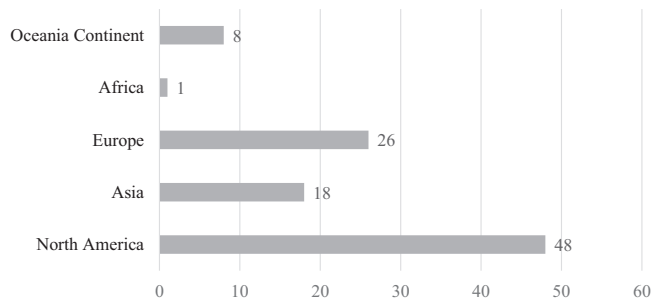
3.1.1 Geographic representation of field experiments. It was observed that 101 studies of the 315 shortlisted articles reported geographical details of the study setting (Figure 2). We found that most studies were carried out in the American region, including Chile, Canada and the USA (Haruvy and Leszczyc, 2021; Koo and Suk, 2020; Robitaille et al., 2021). After the Americas, most studies using the field experiment methodology were carried out in

Serial no.	Journal name	Total published as field experiments/ field studies	Shortlisted articles that qualify as field experiments *	% selected for review
1	<i>Journal of Marketing</i>	100	54	54
2	<i>Journal of the Academy of Marketing Science</i>	50	19	38
3	<i>Marketing Science</i>	81	19	23
4	<i>International Journal of Research in Marketing</i>	44	40	91
5	<i>Journal of Consumer Psychology</i>	45	34	76
6	<i>Journal of Consumer Research</i>	80	56	70
7	<i>Journal of Marketing Research</i>	135	20	15
8	<i>Journal of Retailing</i>	47	38	81
9	<i>Journal of Public Policy and Marketing</i>	19	13	68
10	<i>European Journal of Marketing</i>	43	22	51
Total		644	315	

Table 4.

Overview of journal article sample

Note: *Qualified either as an artefactual field experiment, framed field experiment or natural field experiment

**Figure 2.**
Geographic representation in the reviewed field experiments

Europe (Lepthien *et al.*, 2017; Atalay *et al.*, 2017; Roggeveen *et al.*, 2016). Studies focused on Asian subjects came in third (Gopalakrishnan and Park, 2021; Roy and Naidoo, 2017; Venugopal *et al.*, 2015), and only one study reported field experiments in Africa. Marketing journals could use a variety of strategies, such as inviting special issues that are devoted to field experiments from a particular location, to encourage research from underrepresented geographic areas. Furthermore, very little field research has included participants' demographic information (Bies *et al.*, 2021; Rooderkerk and Lehmann, 2021; Eisingerich *et al.*, 2019). This is not necessarily surprising, as participants are unaware that they are being observed and it is difficult for researchers to record accurate demographic information without revealing their presence.

3.1.2 Types of participants. As depicted in Table 5, scholars have included varied participants to study the associations between study constructs. For example, Bashirzadeh *et al.* (2022), Herzenstein *et al.* (2020) and Osinga *et al.* (2019) have studied customers as sample respondents. Studies such as those by Leipnitz *et al.* (2018) and Angle and Forehand (2016) considered donors, while Dallas *et al.* (2019), Montgomery *et al.* (2018) and Jha *et al.* (2020) used

students as their focal samples. [Van Jaarsveld et al. \(2021\)](#) and [Keeling et al. \(2013\)](#) had employees as their respondents, and [Hogreve et al. \(2021\)](#) and [Brown and Kirmani \(1999\)](#) considered parents and patients, respectively.

3.1.3 Data sources used in field experiments. Scholars have used various data sources to collect data, but five sources were used most frequently ([Table 6](#)). Mechanical Turk was used extensively by [Aydinli \(2021\)](#), [Gerrath and Usrey \(2021\)](#), [Garbinsky and Gladstone \(2019\)](#) and [Vallen et al. \(2019\)](#). [Kronrod and Huber \(2019\)](#) used Qualtrics Panels, and [Blut et al. \(2020\)](#) used an online crowdsourcing marketplace. Interviews were used as a data source for [Heiman and Lowengart's \(2008\)](#) study, while [Kim et al. \(2018\)](#) and [Berry et al. \(2018\)](#) used field data collection tools for their studies. Finally, for the artefactual field experiments, authors have also used controlled lab environments to carry out the experiment.

4. Trends and topics

The reviewed data revealed that less than 2% of all papers published in the reviewed journals between the inception of each journal and February 2022 pertained to field experiments. Of these papers, a notable percentage (9.33%) were published in the *Journal of Marketing*; after that, *Marketing Science* stands second with 3.73% of papers published since its establishment adopting field experiments. All other journals contained a considerably smaller number of field experiments, favoring empirical and non-experimental methods instead.

Nevertheless, there has been an upward trend in the number of field experiments published in the past decade (2011–February 2022), during which time the proportion of such studies has increased from below 2% to 4.34%. *Journal of Marketing* again holds the leading position, with 100 field-experiment-based articles published in the past decade, of which 54 were included in this study. The *Journal of Academy of Marketing Science* has also

Table 5.
Type of participants used in field experiments

Type of participant	Selected exemplary citations
Customer/consumer	Bashirzadeh et al. (2022) ; Bies et al. (2021) ; Herzenstein et al. (2020) ; and Osinga et al. (2019)
Donor	Leipnitz et al. (2018) ; De Bruyn and Prokopec (2017) ; Angle and Forehand (2016) ; and De Bruyn and Prokopec (2013)
Student	Dallas et al. (2019) ; Montgomery et al. (2018) ; Jha et al. (2020) ; and Mead et al. (2020)
Employee	van Jaarsveld et al. (2021) ; Keeling et al. (2013) ; and Boichuk and Menguc (2013)
Parent	Hogreve et al. (2021)
Patient	Brown and Kirmani (1999)

Table 6.
Overview of different data sources

Data source	Selected exemplary citations
Amazon, Mechanical Turk	Aydinli et al. (2021) ; Gerrath and Usrey (2021) ; Garbinsky and Gladstone (2019) ; and Vallen et al. (2019)
Qualtrics panels	Kronrod and Huber (2019)
Interview	Heiman and Lowengart (2008) ; and Harris and Reynolds (2003)
Field data	Kim et al. (2018) ; Berry et al. (2018) ; and Vallen et al. (2019)
An online field experiment	Guo et al. (2016)
Controlled environment	Blut et al. (2020)

improved in this regard, with 50 field-experiment-based articles, and the portion of *Marketing Science* articles based on field experiments has grown to 6%.

The upward trend can be attributed to multiple factors. First, marketing journals have become more stringent regarding endogeneity bias in marketing studies using scanner panel data or historical consumer data (Villas-Boas and Winer, 1999). The ten leading marketing journals make it mandatory for authors to address endogeneity concerns (Simester, 2015). Field experiments provide an alternative mechanism for overcoming this issue. Therefore, the increased attention toward endogeneity concerns has likely contributed to the adoption of field experiments in the past decade.

The second plausible explanation for the upward trend in field experiments is that increased internet access has made it easier to conduct field experiments online. More than 60% of the field experiments published in the past decade have used online platforms. Various e-commerce platforms, Google AdWords and other digital marketing tools make it convenient for scholars to covertly set up field experiments without a sponsor organization. However, there is also an increase in field experiments using physical collection methods inside stores, workplaces and homes. Hence, the third reason for the trend could be increased attention among scholars to boost the external validity of their studies. Finally, in general, there has been an increase in the number of issues that journals publish per volume and an increase in the number of papers published per issue. The overall increase in the volume of papers published has also led to an overall increase in the number of field experiments (Simester, 2015).

4.1 A trend toward the adoption of field experiments

We also analyzed the selected field experiments to identify how scholars are using field experiments to advance the scope of marketing literature. We observed five clear trends in the use of field experiments (Table 7). First, field experiments are increasingly used to complement conventional quantitative approaches, such as structural models (Dubé *et al.*, 2017; Kim *et al.*, 2022). Natural field experiments carried out with exogenous randomized variation aid in the identification and estimation of structural models. At the same time, structural models complement field experiments by helping uncover the mechanisms driving variation in the observed variable (Nelson *et al.*, 2020). For instance, Dubé *et al.* (2017) used experimental data to estimate a structural model explaining how consumer demand is influenced by self-inference of altruism and the attribution of charitable donations to self-signaling.

Trend	Description
Complementary field experiment	Field experiments are used to complement the findings of quantitative studies
Training model-based field experiment	Field experiments are carried out to generate training data for machine learning algorithms
Adaptive field experiment	Automated field experiments are carried out through online platforms to collect real-time data
Behavioral field experiment	Pre-registered field experiments focus on measuring actual behavior as the outcome variable
Marketing strategy	Field experiments carried out to address tactical marketing decisions, that is, decisions related to product, price, promotion and place strategies

Table 7.
Key trends in the adoption of field experiments

Second, there is a surge in the adoption of machine learning algorithms among marketers to personalize their value proposition. Machine learning algorithms learn by simulating past data, also referred to as training data. This has led to an opportunity for marketing scholars to use field experiments to provide training data for machine learning algorithms (Simester *et al.*, 2020). For example, Dubé and Misra (2019) used field experiments to train the price customization model.

A third emerging trend is the popularity of adaptive experiments (Nelson *et al.*, 2020), automated online field experiments carried out over digital platforms in real time. Online field experiments are mostly used for advertising, pricing and targeting research (Dubé and Misra, 2019). Hansen and Tummers (2020) cautioned that adaptive field experiments might result in collusive outcomes if competitor actions are not accounted for in the study design.

The fourth significant trend in field experiments was observed at the intersection of behavioral and empirical research published in the leading marketing journals. In 2020, a special issue on field experiments in *Marketing Science* accepted nine articles, of which four were pre-registered field experiments that investigated behavioral outcomes. Pre-registration is gaining acceptance among marketing scholars because it is accepted as proof of methodological rigor and testimony that the results of their study are confirmatory (Nelson *et al.*, 2020).

Finally, most published field experiments concerned strategic marketing decisions such as product, price and promotion decisions (Figure 3). The reason we inferred for this focus was the ease of manipulation; in comparison, place decisions are difficult to manipulate, as they require cooperation from the organization, channel partners and salesforce, so very few field experiments examine the place decision and its impact on the outcome variable.

4.2 Topics and theories

We categorized the selected field experiments into six marketing topics: pricing, promotion, influencer marketing/brand endorsements, advertising/marketing communication, product testing and branding (Figure 3). We created an additional category of “other” to classify all other topics. We observed that the categories pricing and promotions were by far the largest (102 of 315 papers; 53 were online studies), followed by marketing communications (59 of 315 papers; 54 were online) and influencer marketing/brand endorsement (44 of 315 papers; 27 were online) as the leading topics of interest. Overall, online field experiments outnumbered traditional offline field experiments.

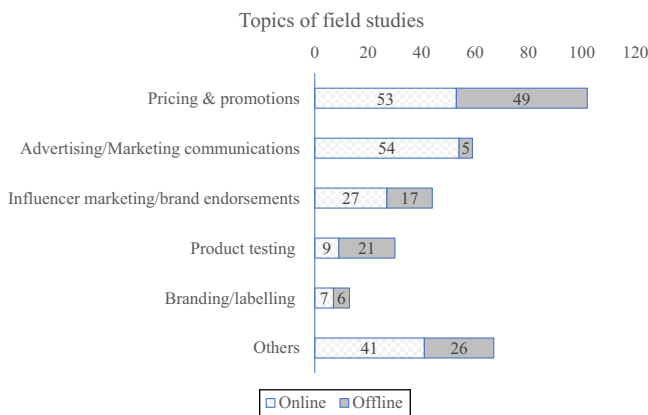


Figure 3.
Overview of topic choices

The digitalization of businesses has made it possible for scholars to manipulate strategic and tactical marketing elements and observe outcomes in an online environment. Furthermore, Web-tracking software tools and Web-scraping can allow users to collect data about real brands anonymously. Previously, scholars had been dependent on sponsors to collect data, so the ease of independent data collection may have contributed to the increase in field experiments in the past decade.

The 102 papers on pricing and promotions can be further subdivided into more specific research areas, including price discounts (Choi *et al.*, 2020; Kim *et al.*, 2014; Sokolova and Li, 2021), pricing for signaling (Anderson and Simester, 2003; Haruvy and Leszczyc, 2009), price elasticity (Kumar *et al.*, 2009) and price innovations such as pay what you want (Chen *et al.*, 2017; Lu *et al.*, 2021). Promotions-focused studies included manipulations, such as incentivizing purchase behavior (Dugan *et al.*, 2021; Leipnitz *et al.*, 2018), the impact of free samples (Kim *et al.*, 2014) and the impact of coupons (Nies and Natter, 2010).

Field experiments in advertising and marketing communications investigated the impact of online experiment on purchase decisions (Lewis and Reiley, 2014), the effectiveness of messaging (Lewis *et al.*, 2015) and the optimization of return on investment metrics associated with digital marketing campaigns (Lesscher *et al.*, 2021; Osinga *et al.*, 2019). The topic of influencer marketing and brand endorsements was considered through research questions on the impact of the type of influencer (Gerrath and Usrey, 2021), influencer disclosure (Karagür *et al.*, 2022) and celebrity credibility (Spry *et al.*, 2011).

Field experiments around product research considered research questions such as the impact of product size and shape (Krider *et al.*, 2001), private labeling (Nies and Natter, 2010), product bundling strategies (Leszczyc and Häubl, 2010) and product labeling and packaging (Anderson and Simester, 2004; Masters and Mishra, 2019). It was not possible for us to classify all the field experiments under these six categories. We classified all remaining studies into the “other” category, including studies validating existing theoretical models or frameworks referrals, WOM or electronic WOM studies and studies on store layout manipulations and salesforce incentivization.

5. Manipulations

The process of manipulating experimental or independent variables, commonly called factors or treatment variables, in an experimental research design is known as experimental manipulation (Allen, 2017). This treatment is applied to the independent variable to influence the targeted variable, known as a dependent variable. The changes in the independent variable through the manipulation process induce desired changes in the dependent variable. Behavioral scientists consider manipulation an imperative component of the experiment because success depends on successful treatment. A miscalculation or mistake can jeopardize the entire experiment, resulting in a waste of resources.

5.1 Use of manipulation at the procedure stage in the experiment

Most of the articles we reviewed mention and describe the manipulation of independent variables at the procedure stage. For example, Balagué and De Valck (2013) indicated that they manipulated participant interaction and the role of questioning. Some scholars introduced the manipulation using a scenario-based method to engage the study participant’s interest and attention.

In the experimental manipulation performed by Pizzutti, Basso and Alborno (2016), study participants were provided a half-page scenario and were instructed to imagine trying to find and fit a pair of jeans in a clothing store. The comments of sales staff were included as a stimulus. Salesperson comments were manipulated with a positive or negative

statement about the imagined pair of jeans. The salesperson's remarks were mainly about the comfort of jeans and the need to be ironed; the study manipulated the significance of the attribute through these two variables. [Roy and Naidoo \(2017\)](#) adopted the same scenario-based manipulation method.

5.2 Manipulation check to validate results

A manipulation check is a test to confirm the success of the intervention's independent variable ([Viglia and Dolnicar, 2020](#)). After performing a manipulation check and finding a significant difference among participants feeling either high or low pressure, [Urbina, Stamatogiannakis and Goncalves \(2021\)](#) reported a successful intervention. [Renard and Darpy \(2017\)](#) also used a manipulation check and revealed a significant difference between a game that did not require player skills and a game that did. Similarly, [Seiders et al. \(2021\)](#) conducted a pretest to confirm the successful manipulation. We also found some studies that reported insignificant effects of manipulation ([Pizzutti et al., 2016](#)).

5.3 Manipulation as a study criterion

A few studies have used manipulation as a criterion to exclude participants. For instance, [Zarantonello et al. \(2021\)](#) used manipulation as a criterion. Of the 174 diaries that came back in that study, three were eliminated because they were not filled correctly. Another eight failed the manipulation check and were excluded from the study based on responses to open-ended questions provided by the participants.

5.4 Format of experimental manipulation

The format of manipulation is another notable element that we observed in our review. Two major types of experimental manipulation have been found in the literature: physical environments and online settings.

5.4.1 Physical environment. In traditional experiments, scholars conduct the studies in a physical setting. For example, [Wang et al. \(2021\)](#) manipulated the study variables (such as pricing strategy) for an experiment conducted physically at a retail store. Likewise, [Hydock et al. \(2020\)](#) collected experimental manipulation in a real physical setting, that is, on campus retailer. [Yang et al. \(2019\)](#) conducted a study at a shopping mall in China and manipulated the experiments in that field setting. [Eigenraam et al. \(2021\)](#) manipulated brand perception and initiative character in a laboratory setting.

5.4.2 Online setting. Crowdsourcing platforms such as Prolific, Mechanical Turk (MTurk), Qualtrics and dedicated webpages have been used to manipulate the experimental conditions for the treatment group. For instance, [Böttger et al. \(2017\)](#) adopted an online mode of experimental manipulation to manipulate the imagery appeal and type of innovation. [Koch and Benlian \(2015\)](#) hired the services of an online media company from Germany to conduct a randomized field experiment, and [Bacile et al. \(2014\)](#) also collected their experimental data online.

5.5 No manipulation

Some studies reported no manipulation for the field experiment. [Gaston-Breton and Duque \(2015\)](#) noted that manipulations were done in laboratory studies, as they considered performing these in a field experiment to be unnecessary. Similarly, [Das et al. \(2020\)](#) argued that the field experiment setting did not provide a sufficiently controlled environment to manipulate both the presence of ethical attributes and purchase context. As such,

manipulation was not used for their field experiment. The remainder of studies did, however, perform experimental manipulation.

5.6 Multilevel or sequential manipulations

Certain scholars manipulated a single independent variable for three levels or sequential stages: single-, two- or multilevel design. They manipulated a single independent variable to generate several different conditions as per the requirements of the study. In this methodological review, we found evidence for single independent multilevel design in several studies. [Spry et al. \(2011\)](#) manipulated endorser credibility at two levels to produce two different conditions. Three sequential stages of manipulation were also staged by [Koch and Benlian \(2015\)](#). Additionally, manipulation was studied at the individual and group level; many of the studies discussed manipulation at the individual level. In [Harmeling et al. \(2017\)](#), the feelings of study participants were successfully manipulated at the group level.

6. Limitations of the field experiment method

A thorough review of the selected studies helped us identify the six foremost limitations cited in the extended literature: replication, causality, low internal validity, randomization bias, sponsorship and participant consent ([Table 8](#)).

6.1 Replication

Most of the published studies reported difficulty in replicating the findings as a potential limitation of field experiments. Unlike lab experiments, where another independent

Limitations of a field experiment method	Phrases used to report limitations	Recommendation
<i>Replication</i>	The relationship between outcome variable (O) and stimuli (S) was in the context of/was based on a sample from/was measured during the event. Hence, the results may be different when the context/sample, etc., is different	Conceptual replication studies can be carried out for partial replication using an artefactual field experiment approach
<i>Insufficient evidence about causation</i>	As we used method (M) to study the impact of (S) over (O), our results do not imply causation	Carry out follow-up qualitative study or quantitative study using field experiment outcomes to frame structural model
<i>Low internal validity</i>	Our study does not control for/did not include or exclude variable (X). Our findings are limited to the effect of (S) over (O), and the relationship might vary with the inclusion of variable (X)	Conduct follow-up studies that can be conducted as a controlled lab experiment
<i>Randomization bias</i>	Because of the natural setting of the study, participants were self-selected. The results may be influenced by self-selection bias.	Carry out artefactual field experiments. Alternatively, the data collection schedule could be randomized and data collected across different time periods or a longitudinal study could be conducted
<i>Sponsorship</i>	Authors do not report this explicitly	Carry out online field experiments
<i>Participant consent</i>	Authors do not report this explicitly	Seek approval from the ethics committee before collecting data

Table 8.
Limitations of field experiment method

researcher can easily reproduce the findings, the ways in which field experiment findings can be replicated are limited. In general, there are three types of replication studies:

- (1) confirmatory replication, wherein the independent researcher re-analyzes the original data set to reproduce the same results;
- (2) conceptual replication, wherein the independent researcher replicates the research question and conceptualization but the interventions and manipulations are modified; and
- (3) direct replication, wherein the independent researcher attempts to re-create the experiment by replicating the methods, settings and similar sample participants to reproduce the same results.

While it is possible to carry out confirmatory replication in the case of field experiments, conceptual replication is only possible with certain limitations, and direct replication is not at all possible. As field experiments are driven by an opportunity that arises because of cooperation between the sponsoring organization and the researcher, direct replication becomes a natural limitation. In the majority of cases, the sponsor might not agree to repeat the study, or it might be impossible to re-create the specific situation; for example, a field experiment conducted during Brexit cannot be replicated. Therefore, it is advisable to carry out a conceptual replication or perform a replication study in a controlled lab experiment.

6.2 Causality

The second limitation is that a field experiment does not provide sufficient evidence of causation. In a natural field experiment, the researcher observes the changes in the outcome variable by manipulating the experimental conditions; that is, the researcher seeks to observe a change in the dependent variable because of exogenous variation (List, 2011). Therefore, it is often difficult to explain counterfactuals that are not included in the study settings. [Nelson et al. \(2020\)](#) argue that field experiments can be complemented with conventional quantitative structural models to overcome the limitation. Alternatively, [Aguinis et al. \(2020\)](#) suggest conducting quasi-experimental studies or artefactual field experiments that allow the non-random assignment of non-standard samples to different field experiment conditions.

6.3 Low internal validity

The third major limitation of field experiments is low internal validity. As a result of this, field experiments cannot identify alternative theoretical explanations for a phenomenon being studied. For example, findings from a study conducted to measure the impact of peer pressure on brand selection in a retail outlet cannot explain whether the brand selection was because of variety-seeking behavior among consumers ([Otterbring, 2021](#)). In another instance, [Roy and Das \(2022\)](#) manipulated the presence of a salesperson to test the cause-and-effect relationship between social influence and pay-what-you-want (PWYW) behavior. The study also tested the moderation effect of music type. However, there could be an alternative explanation using uncertainty avoidance theory; after consumers have consumed the services, there is no service uncertainty. Similarly, the prevalent culture also plays a significant role in PWYW behavior, which the above study's findings cannot explain. Therefore, conducting a follow-up lab experiment can be helpful in understanding alternative theoretical explanations.

6.4 Randomization bias

Several studies reported self-selection of study participants, also referred to as randomization bias, as a potential limitation. Randomization is a tool used to reduce selection bias, control confounding variables and attain statistical significance. In field experiments, randomization is difficult, but [Harrison et al. \(2009\)](#) have argued that artefactual field experiments can potentially reduce the risk of randomization bias.

6.5 Sponsorship

A field experiment is conducted in a natural setting; therefore, studying real-life consumer behavior in marketing research requires a cooperative industry partner willing to allow scholars to implement the intervention with their consumers in a real-world setting. Most scholars have reported a lack of cooperation with their industry partners as a significant limitation in carrying out field experiments. The industry sponsor may forbid treatments that might be interesting from the academic perspective but pose economic risks to the sponsoring company. In relation to cooperation issues, there is a potential publication bias, as industry partners often revoke their consent to publish findings when those findings reflect badly on the sponsor.

6.6 Participant consent

Finally, field experiments are criticized for breaching ethical guidelines by not seeking explicit consent from the study participants ([List, 2008](#)) and manipulating the natural environment in a disguised manner. While opinions differ and journals have different requirements for approval from the human research ethics committee on informed consent, prior literature suggests that informed consent may be optional if the researcher ensures three conditions in implementing a field experiment. First, the participants must be physically and mentally capable of providing their consent; second, the interventions must be free from any undue influence or coercion; and third, participants must be in a position to comprehend the risks associated with their participation in the study.

7. Important considerations in designing field experiments

In this section, we reflect on the field experiments reviewed and briefly discuss the key considerations that scholars must note when designing and executing field experiments. Conducting a field experiment requires a careful and systematic approach, so we suggest a list of steps and considerations to ease this process. However, the list is not exhaustive; rather, we discuss the factors that are unique to field experiments but were often ignored in published studies ([Figure 4](#)).

7.1 Motivation for a field experiment

A field experiment must make a significant contribution to theory and practice. Mere documentation of a field experiment in a natural setting without a well-motivated research question and findings without substantial implications are likely to be rejected in the leading marketing journals. [Nelson et al. \(2020\)](#) reported that field experiments are often conducted in response to an opportunity presented by a sponsoring firm, a consulting assignment or access to data from a past study. While such opportunities may be tempting, they may not always result in substantial contributions.

[Nelson et al. \(2020\)](#) made observations about field experiments and grouped the failures to contribute into three categories:

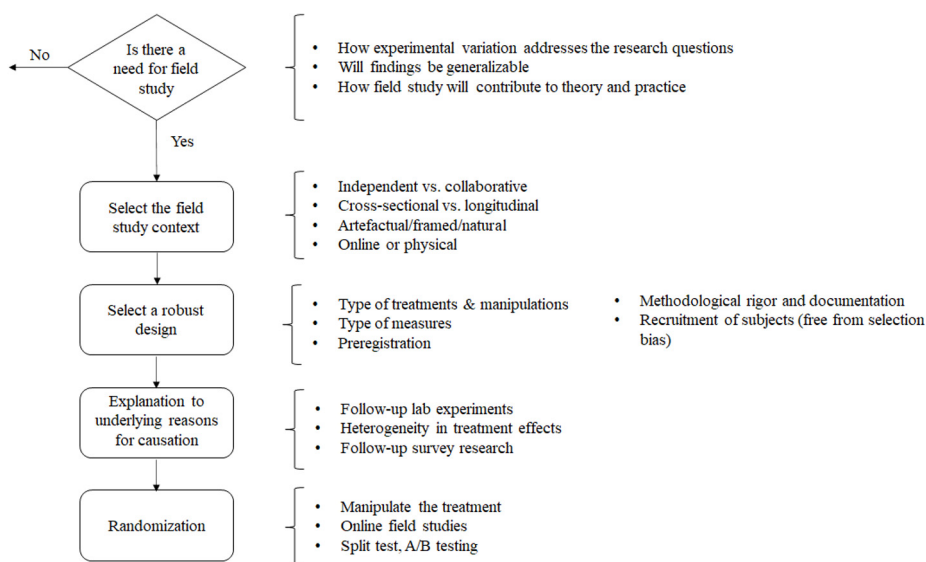


Figure 4. Process diagram for carrying out field experiments

- (1) *Lack of contribution to theory*: The question is over-researched, or the experimental manipulation is disconnected from the research question.
- (2) *Lack of generalizability*: The findings of the field experiment are obscure.
- (3) *Lack of practical/managerial implications*: The findings are inconsistent and/or obvious.

Therefore, marketing scholars should first answer the question of why it is important to conduct a field experiment, including its motivation and how it will lead to a substantial contribution.

7.2 Selecting the context and type of the field experiment

The context of the field experiment must be clearly identified and selected at the beginning. For example, a study that aims to examine the impact of Instagram influencers on user engagement (in the form of likes, shares and comments) needs to conduct a study on Instagram (Karagür *et al.*, 2022). While in some instances, the scholars may independently select the context and setting for their study, other field experiments may require a sponsor/collaborator or a non-academic partner. However, scholars may choose to carry out independent studies to exercise greater control over the design of the study and test existing theories and frameworks. A field experiment designed in collaboration with a sponsor provides options for easily carrying out follow-up studies and measuring long-term effects, whereas an independent field experiment is often impossible to precisely recreate. For example, a field experiment aimed at observing the outcome of the PWYW pricing strategy was designed to include offering a donut (Saccardo *et al.*, 2016) or a cup of coffee (Jung *et al.*, 2014) to people at a public spot; this might not be possible for all type of research questions. On the contrary, in a collaborative study with a non-academic partner, all possible scenarios can be created as long as the collaborating organization is willing.

Field experiments can, for example, be designed with private or public organizations or government agencies. While it is possible to conduct an artefactual field experiment and a framed field experiment independently, conducting a natural field experiment in collaboration with a non-academic partner is advisable. We further recommend that before reaching out to the non-academic partner, the scholar should first develop a sound understanding of the sector and how the non-academic partner operates. Finally, scholars should objectively assess the potential advantages and disadvantages of conducting a collaborative study with non-academic partners.

7.3 Robustness of study design and identification of noise factors

As discussed in the limitations section, field experiments are often constrained by the researcher's limited ability to control environmental factors and other external variables. Therefore, the researcher should attempt to anticipate such challenges at the design stage and develop methods in response during the data analysis stage. Scholars must carefully consider the situational factors and time effects. For example, people are likely to be excited after a skiing experience or may be conservative in shopping during the last week of the month. As a result, the researcher may observe differential behavior during such time periods. Ideally, the researcher should capture such variations in the study setting in real time and document irregularities. Once captured, the researcher can then deal with these variations in multiple ways. For example, time patterns can be addressed by creating detailed protocols and randomization in data collection. It should be standard procedure to develop meticulous protocols and anticipate as many variations in the data collection process as possible. Finally, the study design must be sufficiently flexible to respond dynamically to situational changes, and researchers must be prepared to adapt accordingly.

7.4 Going beyond the main effect and explaining reasons for causation

We observed that field experiments published in marketing journals are similar to those published in other domains, such as public administration, economics and other social sciences. However, field experiments in marketing require additional efforts to explain the underlying factors driving causation (Nelson *et al.*, 2020). For example, a study documenting the effectiveness of multiple-unit promotions over single-unit promotions may not be that useful for practitioners (Wansink *et al.*, 1998). The significance of the study comes from its ability to invoke the principle of "anchoring and adjustment" to explain the phenomenon. This puts a major constraint on marketing scholars because it is not always feasible to interact with the study participants or quantitatively measure potential causative factors during the data-collection process.

We identified three approaches used in previously published studies to address concerns about causation. First, many scholars tested interaction and main effects and then used the results to draw inferences about causation (Berger and Schwartz, 2011; Tucker and Zhang, 2011). Therefore, scholars aiming to conduct and publish field experiments must carefully consider the type of interaction effects they can measure. Furthermore, they must be able provide a strong justification for how interactions are consistent with their line of argument and rule out possible alternative explanations. The second approach is to conduct additional field experiments with different study conditions, treatments or both. We also observed that some studies used lab experiments to validate the findings of field experiments in a more controlled environment. The third approach is to seek an explanation for causation through customer surveys (both qualitative and quantitative). We recommend that scholars aiming to publish field experiments use these three approaches in combination.

7.5 Randomization

Randomization is an established and reliable statistical method for the selection of homogeneous treatment groups and for preventing any selection biases or judgments. However, as discussed in the limitations section, randomization is not a mandatory requirement for publishing field experiments in leading marketing journals. Given that randomization is a constraint in field experiments, we recommend scholars rotate field experiments across time. However, it is much easier to attain randomization in online field experiments, so scholars must think of innovative ways to achieve randomization in their algorithms and test the effects of, for example, different Web pages and landing pages. For offline field experiments, we recommend that scholars adopt split tests or an A/B testing strategy to compensate for the lack of randomization.

8. Conclusions and future research directions

Field experiments are gaining momentum in marketing research. The variety of topics examined using field experiments, along with a diverse range of samples, study contexts, manipulations and dependent variables, indicates the method's potential in this context. However, marketing scholars are reluctant to use field experiments, citing several challenges in their design and implementation. This systematic methodological review of field experiments provides a glimpse into their possible applications in marketing research and offers methodological guidance to marketing scholars on how to handle difficulties they encounter.

Reviewing published field experiments from ten leading journals in the marketing discipline, we identified five key characteristics of field experiments: realism, generalizability, abstraction, obtrusiveness and precision. We present a simplified classification of field experiments as artefactual, framed or natural for an easy understanding of their use by marketing scholars (Baldassarri and Abascal, 2017). This review also revealed various trends and topics covered in the domain of marketing. We identified the different manipulation methods most commonly used in prior research, discussed the apparent limitations of field experiment research in this domain and put forth suggestions for designing and conducting field experiments.

In conclusion, this systematic methodological review lays out the merits of carrying out field experiments along with various limitations and challenges associated with doing so. We observed that some topics are under-researched, such as activation, channel relationships (upstream and downstream) and channel conflicts, found limited field experiments related to business-to-business marketing issues and noted a dearth of field experiments related to optimization problems such as keyword and search engine optimization: future research would do well to address these topics. Scholars could also conduct field experiments to better understand consumer needs and service gaps to identify trajectories for product development and to explore broader marketing issues, such as the impact of social issues, prosocial behavior and pro-environmental behavior on consumer decision-making. We strongly recommend conducting follow-up lab experiments and quasi-experimental studies to complement the findings of field experiments, rule out alternative explanations and strengthen external validity. These are vital considerations in designing field experiments and must be addressed.

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