

The Rise of New Technologies in Marketing: A Framework and Outlook

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As a scholarly field, marketing has a long tradition of studying the adoption of new technologies. This attention is certainly warranted, as studies consistently demonstrate that, compared with firms that do not invest heavily in new technology, those that do are more agile and enjoy a strong competitive advantage (IBM Institute for Business Value 2021). However, what has received less attention in the literature is how new technologies give rise to innovations in marketing techniques, tools, and strategies themselves. In particular, there is a need for marketing scholars to develop theoretical paradigms of how marketers use technologies to develop a competitive advantage.

This special issue on “New Technologies in Marketing” presents cutting-edge scholarly research that recognizes the foundational role of new technologies in driving marketing theory and practice. The articles in the special issue study a broad range of new technologies, and we hope they will stimulate further research concerning new technologies in marketing and their application in practice. In this editorial, we provide several frameworks for thinking about how new technology affects the marketing discipline. These frameworks serve to organize the portfolio of articles in the special issue, identify potential gaps worthy of further study, and propose an agenda for future research.

New Technologies in Marketing: Scope

Prior research has defined “technology” as scientific knowledge and its applications to useful purposes (see, e.g., John, Weiss, and Dutta 1999). This definition recognizes that technology can relate both to the product or the service that follows from the scientific knowledge and to the knowledge itself. In doing so, it avoids the necessity of distinguishing between the product or service (e.g., chatbots) and the technology (e.g., artificial intelligence [AI]) it encompasses, which is, at times, impossible to do (Glazer 1991).

Because technology matures over time, we also define the term “new” as referring to recent applications of scientific knowledge that have not been replaced by others. In other words, technology is “new” when it is early in the adoption cycle for firms and/or consumers (i.e., in the innovator or early adopter phase).

The articles in this special issue examine a range of new marketing technologies that fall in one or both points of the adoption cycle. As such, these articles necessarily employ diverse research methodologies. Specifically, technologies that are further along are more likely to have produced hard data because a sufficient number of firms or consumers have adopted the technology to enable the antecedents or consequences of adoption to be empirically observed and quantitatively analyzed (e.g., augmented reality as in Tan, Chandukala, and Reddy [2022], livestream sales calls in Bharadwaj et al. [2022]). Other technologies fall earlier in the adoption cycle, and their adoption antecedents or consequences can only be established experimentally (e.g., chatbots as in Crolc et al. [2022], AI-based recommendations as in Longoni and Cian [2022]) or conceptually (e.g., genetics as in Daviet,

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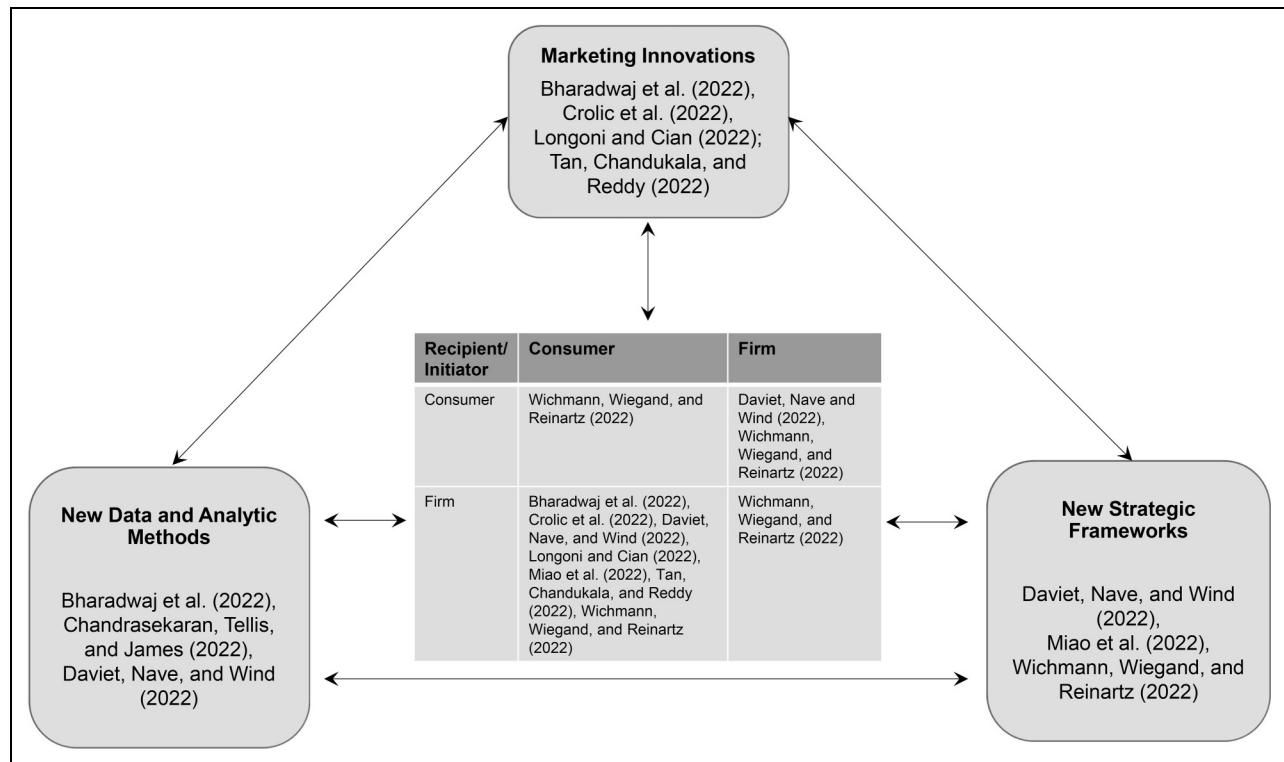


Figure 1. Four ways new technologies impact marketing.

Nave, and Wind [2022], platforms as in Wichmann, Wiegand, and Reinartz [2022], avatars as in Miao et al. [2022]).

Integrating all these considerations, we define new technologies in marketing¹ as “scientific knowledge and/or its application in the early adoption cycle for firms and/or consumers with the potential to influence the activity, institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large.”

Four Ways New Technologies Impact Marketing

At a high level of abstraction, we observe that new technologies impact marketing in four broad, interconnected ways, as diagrammed in Figure 1. Specifically, new technology (1) supports new forms of interaction among consumers and firms, (2) provides new types of data that enable new analytic methods, (3) creates marketing innovations, and (4) requires new strategic marketing frameworks. It is important to keep in mind that different technologies can serve these multiple functions at the same time and to varying degrees. For this reason, some articles in the special issue appear in more than one cell in Figure 1.

¹ We adopt the American Marketing Association’s definition of marketing (<https://www.ama.org/the-definition-of-marketing-what-is-marketing/>).

New Forms of Consumer and Firm Interactions

We start in the center of Figure 1 with how new technology may enable new forms of consumer-to-consumer, consumer-to-firm, firm-to-consumer, and firm-to-firm interactions. Many firms now enable direct consumer-to-consumer interactions by engaging consumers around brands. For example, brands such as Nike and Adidas have developed digital platforms to promote interactions among communities of runners and coaches as well as third parties (Wichmann, Wiegand, and Reinartz 2022).

New technologies have often been effectively deployed to improve firm–consumer interactions by providing new marketing tools. For example, AI is a powerful engine in replacing human representatives of the firm with machine agents, facilitating firm–consumer interactions via “word of machine” (Longoni and Cian 2022). Anthropomorphized chatbots can influence consumer response in consumer-initiated service interactions (Crolc et al. 2022). In addition, avatars are increasingly used in firm–consumer interactions, where the extent of an avatar’s form and behavioral realism is a major determinant of its effectiveness (Miao et al. 2022). Augmented reality (AR) is used in retailing to facilitate firm–consumer interactions, which, as a “try before you buy” technology, is especially effective when consumers are uncertain about products (Tan, Chandukala, and Reddy 2022). Computer vision and facial recognition methods present new tools for marketers that can be used to enhance the effectiveness of livestream personal selling (Bharadwaj et al. 2022).

New Data and Analytic Methods

New technologies also give rise to new data and spawn new analytic methods, as shown on the left side of Figure 1. For example, Bharadwaj et al. (2022) propose an analytic framework that utilizes computer vision methods to analyze the effectiveness of salespeople's facial expressions in livestream selling. Chandrasekaran, Tellis, and James (2022) offer an approach for firms to assess the potential of new technologies to make informed product launch and product retirement decisions. Further, Daviet, Nave, and Wind (2022) portray a future in which consumers may consent to the use of their genetic data to improve customer targeting and new product development. These studies show that by altering consumer-to-consumer and consumer-to-firm interactions, new technologies produce new forms of data. In turn, these new forms often require the development of new methods or the adaptation of existing ones to process or analyze these data.

Marketing Innovations

The top of Figure 1 highlights the potential for new technologies to provide new marketing tools and techniques that lead to innovations in the marketing of products and services. For example, Bharadwaj et al. (2022) show how personal selling via livestreaming can be optimized with computer vision AI. Longoni and Cian (2022) analyze the effectiveness of AI-based "word of machine," while Crollic et al. (2022) examine chatbot effectiveness. Tan, Chandukala, and Reddy (2022) analyze the effectiveness of AR in retailing. Studies like these reveal that new technologies enable marketers to develop and deploy new tools that render the marketing of products and services more effective.

New Strategic Frameworks

Finally, new technologies enable new marketing strategies and strategic frameworks, as shown on the right side of Figure 1. Wichmann, Wiegand, and Reinartz (2022) conceptualize digital platforms as places for consumer crowdsourcing and crowdsending of products and services. Miao et al. (2022) propose a typology of avatars that guides marketers in their decisions about how to design and deploy avatars. Daviet, Nave, and Wind (2022) propose a framework that integrates the impact of genetics into consumer behavior theory and use that framework to provide an overview of marketing uses of genetic data. These articles show the value of new strategic frameworks in understanding the impact of new technologies on the marketing domain. They also provide guidance for how to formulate the most relevant research questions.

New Technologies Fundamentally Alter Marketing Decision Making

Having discussed the four fundamental ways that new technologies are influencing marketing practice, we now offer a

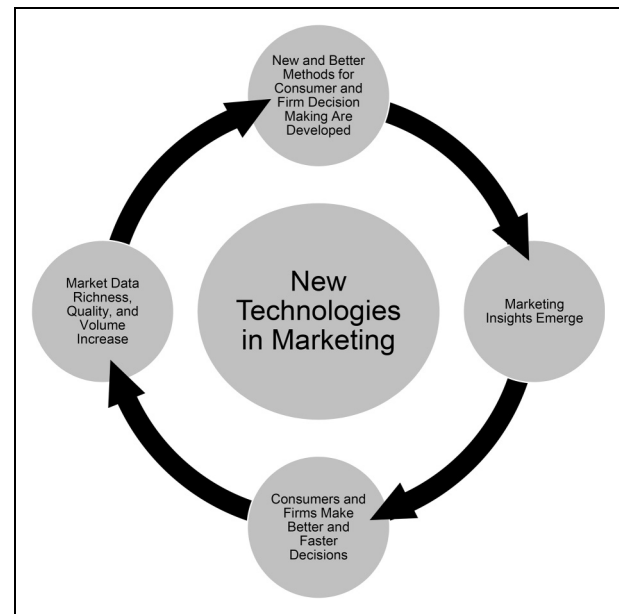


Figure 2. New technology improves marketing decision making.

framework for understanding how they are improving marketing decision making and associated firm and marketplace dynamics. Figure 2 presents a flywheel demonstrating the energy stored and deployed when firms invest in new marketing technologies to yield increasing returns. Starting on the left, new technology may enhance the richness, quality, and volume of market and consumer data (see Figure 1). For instance, the explosive growth of digital devices and software applications has created data streams that capture how consumers think, feel, behave, and interact with other consumers and firms at various points along the customer journey (Wedel and Kannan 2016). Some data that may have previously been out of reach for many firms, such as eye movement, speech, facial recognition, and genetic data, may become ubiquitous as the cost to collect and analyze them rapidly decreases (see, e.g., Bharadwaj et al. 2022; Daviet, Nave, and Wind 2022). Digital data-capture technology, which produces data on consumer-firm interactions via images, video, speech, and text, among others, has also enabled large-scale field experiments and A/B tests that allow companies to assess the causal effects of their marketing actions. With these experiments, marketers can optimize website designs, effectively retarget advertising, evaluate the effects of new marketing tools, and attribute effects to marketing actions throughout the customer journey.

Moving clockwise around the flywheel, we argue that the increased availability of rich data leads to new and better methods for consumer and firm decision making (top of Figure 2). To a certain degree, data quality can be a substitute for model complexity. For instance, in A/B testing, the data-generating mechanism is controlled by the researcher or firm so that simpler models may be used (see Tan, Chandukala, and Reddy 2022). However, the idea that simpler models are always adequate is misguided. Increased data richness (e.g., reviews,

search, blogs, location, images, video, speech, eye, hand, head and body movements, genetic data) often requires more complex models or machine learning approaches. Further, greater data volume reduces sampling and measurement errors. Both the increased richness and volume of data allow for superior predictive performance of machine learning methods. As a case in point, Bharadwaj et al. (2022) demonstrate how a large-scale application of computer vision methods for image analysis, coupled with sophisticated statistical techniques, leads to superior predictive performance of sales outcomes.

The right side of the flywheel highlights that better methods enable marketers to derive new and valuable insights. For example, Chandrasekaran, Tellis, and James (2022) develop a method that gives managers insight into whether to adopt a new technology, continue capitalizing on the old technology, or invest in both the new and old technologies. Further, Tan, Chandukala, and Reddy (2022) research demonstrates that AR can reduce consumers' product uncertainty and thus improve marketing and sales outcomes.

At the bottom of the flywheel in Figure 2, we highlight how better insights derived from new technology can enable better and faster decision making by both consumers and firms. AR in retail can better inform and educate consumers and therefore improve their decision making on products and services (Tan, Chandukala, and Reddy 2022). Chatbots enable real-time interactions with the firm that can provide consumers with insights and information to improve their satisfaction, firm evaluations, and purchase intentions (Crocic et al. 2022). These interactions, in turn, generate more and richer data to continue the cycle.

New Technologies in Marketing: Future Directions

This section pulls the different elements of our perspective together, emphasizing key learnings for marketers and marketing scholars. We also identify several high-potential future research directions. These recommendations are grounded in our own work in this area and fueled by editor efforts that preceded the special issue (e.g., the 2019 Theory+Practice in Marketing [TPM] conference focused on New Technologies in Marketing and a special session on the same topic at the 2019 European Marketing Academy Conference).

Trends in Marketing Decision Making: Automation and Personalization

Technology-enabled interactions, methods, innovations, and frameworks (Figure 1), along with the market and marketing knowledge they generate (Figure 2), offer marketers the opportunity for real-time or automated decision making. For example, AI is beginning to play an important role in automatically generating tailored offerings based on individual consumers' search behaviors and navigational histories. Similarly, AI is starting to figure into firms' new product development decisions (e.g., go/no-go launch decisions). The current automation versus

augmentation debate in AI (Raisch and Krakowski 2021) suggests that there is enormous opportunity for research on the types of human/AI collaborative teams that will be most effective in different marketing contexts.

Technology-enabled interactions also offer marketers opportunities to observe consumers engaged in new ways with products, brands, stores, firms, and other consumers. These observations provide a deeper understanding of consumers' relationships and preferences and give companies the opportunity to create new sources of value for both the consumer and the firm. In particular, personalization and recommendation systems will remain a key area for future research.

As the trend toward automated marketing decision making accelerates, it seems particularly important to establish the boundaries of increasingly popular machine learning and AI methods. For example, how sensitive are machine learning applications in marketing to small perturbations (adversarial attacks) of the input? How well do these systems perform on data/problems that fall outside the domain of training data? How can the interpretation of machine learning approaches applied to marketing problems be enhanced? What is the role of machine learning in making causal inferences from quasi- and nonexperimental data?

Trends in Consumer Decision Making: Augmented/Virtual Reality and Autonomous Products

Technology is enabling consumers to interact with products, firms, and each other in virtual reality (VR) and AR. While many of the well-established theories in consumer behavior may extend quite naturally into virtual spaces, many may need to be updated significantly to accommodate consumers' search, choice, and consumption practices. For example, how is context-relevant information (e.g., product information, recommendations) presented in virtual or augmented environments processed? How do embodiment and the experience of presence facilitate information acquisition and consumer decision making in virtual contexts? What are the consequences of VR/AR engagement, including for self-image, anxiety, and interpersonal interactions? What roles do sharing platforms play in the development of consumers' self-presentation strategies, political views, body image, and values (e.g., materialism)?

Another important trend in consumer behavior involves the adoption of autonomous products. Traditionally, consumers have purchased products that assist them in accomplishing particular tasks (e.g., mowing the grass, cooking a meal). Now, autonomous products that remove the consumer from task accomplishment altogether are increasingly available. Consumer researchers need to extend existing theories to understand how consumers perceive, feel about, and interact with these autonomous devices (De Bellis, Johar, and Poletti 2021). How do consumer experiences emerge from repeated interactions with AI-powered smart devices, as initiated in the work by Hoffman and Novak (2018) that situates consumer behavior in a broader, non-human-centric context? This "object-oriented" approach is not only novel but also important because consumers can increasingly actively interact with new

technologies that now have their own capacity for autonomous action. To fully understand consumer experience with new technology, researchers must consider that consumers' perceptions of new technology go beyond internal subjective responses and are influenced by (and can influence) the agency, autonomy, and authority of technology itself.

Broader Research Directions for Marketing Scholarship

While the prior two subsections leverage existing trends to identify important research questions, we also wanted to think further into the future to outline broader research directions for the field. To accomplish this goal, we first compared the flow of papers for both the TPM Conference at Columbia University that launched the special issue and the special issue itself with what we described in our original call for papers. Doing so allowed us to identify gaps between the topics we envisioned originally and the actual coverage these topics have received in this special issue. Second, we ideated along the dimensions of consumer behavior, market research, and marketing decision making to identify high-potential future research areas. We discuss each in turn.

The role of new technology in the marketing organization. How do new marketing technologies change marketing's role within the firm? What is the effect of the adoption of new technology by marketing on firm performance more generally? How does new technology change the way marketing collaborates with other functions, including the interfaces with operations (e.g., collaboration between the two functions on push notifications or product returns), research and development (e.g., new product/service development, product upgrades, quality control), and information technology (e.g., marketing technology budgets and decision making)?

The social and policy effects of new technology in marketing. How should firms react to policy initiatives that intend to protect consumer privacy and limit data access? How should firms that develop, commercialize, or use new marketing technologies act ethically in society and engage in the public debate about the consequences of their actions on firms, consumers, and society? How can we identify the public risks that new marketing technologies carry, and how should society manage those risks? What are the relevant consequences of new policy initiatives, such as those on climate change, for new technologies in marketing?

The "dark side" of new technology. Eliminating face-to-face interactions can make transactions more efficient from the perspective of the firm. What are the implications for firms' relationships with customers? Can this shift contribute to feelings of isolation and loneliness? The dramatic loss of privacy as the result of new technology usage has become a major concern for consumers. What are the behavioral consequences of the loss of privacy as a result of consumers' expanding digital footprint? What methods can be used to guard consumers' privacy and data security while allowing for real-time personalization?

As new technologies are integrated into marketing practice, questions emerge about the potential for bias in firms' decision making. Research involving AI should explicitly address ethical aspects of the AI technology on the constituent populations. The

potential for algorithmic bias across all digital applications, particularly social media, requires a clear understanding of the ways in which these systems may operate suboptimally and negatively impact consumer welfare. In general, as we develop new marketing methodologies and populate them with richer and bigger data flows, we need to be aware that these "improvements" in marketing decision making may inadvertently harm stakeholders (see Mehrabi et al. 2022).

Ensuring the Relevance of the Marketing Scholar

In the face of the changing role of the marketer, the future research areas identified previously present opportunities for marketing scholars to remain relevant and influential. The pace at which new technologies are developed and implemented stands in sharp contrast to the speed with which scholars can access data derived from such technologies, develop rigorous frameworks to analyze the phenomena, and move the research through the review process (the present special issue included). Three guidelines for future scholarship may help address this dilemma for research on new technologies in marketing and, perhaps, for marketing scholarship more generally.

First, we can (more) effectively leverage our connection to practice (see Deighton, Mela, and Moorman 2021; Stremersch, Winer, and Camacho 2021). Much of the new technology deployment in marketing happens at increasing speed inside companies. Within these companies, the insights function is learning quickly what does and does not work. Marketing scholars who develop close connections with practice can study the impact of what firms and organizations are doing in real time to maintain their role as knowledge developers, rather than becoming only knowledge distributors. As scholars, we may need to step up our efforts to work with firms to remain at the forefront of knowledge development.

Second, we can be more oriented toward the future by removing some of the limits created by empirical requirements. Specifically, we need to embrace conceptual research more enthusiastically (consistent with Yadav's [2010] call) to stay ahead of real-world implementation. We need to embrace mixed-methods approaches that can foster important insights rather than dogmatically viewing some approaches as easier to work with, more scientific, or more fashionable than others.

Finally, we need to encourage and reward scholars who address important forward-looking, even difficult, research questions that have the potential to influence practice. When we as marketing scholars rigorously tackle big questions with an open, future-oriented mind, in closer collaboration with business practice, we can exploit the vast research opportunities that the new technology revolution in marketing presents. Scholars who do so successfully will take center stage in our field and will inspire marketers to strengthen their firms' competitive advantage and continue to improve and enrich people's lives with new technology.

Ensuring the Relevance of the Marketer

The articles in this special issue reveal the highly specialized knowledge that marketers need to possess to operate effectively

in new technology environments. Given the overwhelming impact of new technology on marketing practice, firms are in increasing need of marketers who understand the full scope of the new technologies used by consumers, how new technologies can translate consumer data into insights, and the new technologies that the firm can employ to achieve more favorable marketing and consumer outcomes.

Those marketers should become cornerstones of the firm's digital transformation journey. Some have called these specialists "marketing technologists" (e.g., Brinker and Heller 2015). They understand that new technologies may gain traction at any time and disrupt the way in which companies most effectively serve their customers. They should anchor on the firm's purpose and goals and pursue the deployment of technologies in an agile manner. Moving forward, nondigital technologies (e.g., genetic data, decision science) will become part of marketers' portfolio as well. While the marketing technologist might become a specialized function, marketers in the future should incorporate some aspects of and be able to communicate with the (marketing) technologist.

Conclusion

This special issue on "New Technologies in Marketing" presents a broad spectrum of research that investigates how new technologies drive marketing practice and can stimulate further research. By elucidating how new technology enables new forms of interaction among consumers and firms, this research shows that new technology is spawning new types of data and analytic methods, creates marketing innovations, and gives rise to new strategic marketing frameworks. Collectively, the articles in this issue demonstrate the virtuous cycle whereby firms deploy new marketing technologies, which enhance the richness and volume of market data, which spawn new analytic methods, which enable novel insights, which support more effective marketing decisions, which improve the collection of additional market data, and so on. Against this backdrop, and inspired by the research presented in this special issue, we provide recommendations for future research and offer thoughts on how the marketing scholar and marketing practitioner can stay relevant in the context of rapid developments of new technology. We hope that the articles in this special issue will inspire marketing scholars to take on those future research challenges.

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