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Editorial

On ChatGPT and beyond: How generative artificial intelligence may affect research, teaching, and practice

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ABSTRACT

How does ChatGPT, and other forms of Generative Artificial Intelligence (GenAI) affect the way we have been conducting—and evaluating—academic research, teaching, and business practice? What are the implications for the theory and practice of marketing? What are the opportunities and threats, and what are some interesting avenues for future research? This editorial aims to kick off an initial discussion and stimulate research that will help us better understand how the marketing field can fully exploit the potential of GenAI and effectively cope with its challenges.

1. Introduction

The rapid diffusion and stunning performance of ChatGPT has been recently disrupting our world. ChatGPT (Chat Generative Pre-trained Transformer) is a free chatbot developed by OpenAI, a San Francisco-based tech company, that generates text in response to a human-provided prompt. It is based on large language models (LLMs) that autonomously learn from data. Within two months after its launch on November 30, 2022, ChatGPT has reached more than 100 million users.[1]

As editors, ChatGPT caught our attention when *Nature* (Else, 2023) reported a study in which researchers asked the chatbot to write abstracts in the domain of medical research. Human reviewers were subsequently asked to identify those abstracts in a batch of original and generated abstracts. The reviewers correctly identified only 68 % of the generated abstracts and falsely identified 14 % of the original abstracts as generated. Further, the generated abstracts were qualified as original by a plagiarism detector (for more details, see Gao, Howard, Markov, Dyer, Ramesh, Luo, & Pearson, 2022). Relatedly, a week later, *Nature* (Stokel-Walker, 2023) reported the emergence of ChatGPT as a coauthor on several academic papers. Thus, we had to think about the immediate implications also for *IJRM*. Can ChatGPT be a co-author? How should we go about AI generated literature reviews?

While we explicate our corresponding opinion and policies for the journal below, we also see the need—and opportunity—for a more fundamental discussion of the bigger, long-term implications of ChatGPT and other forms of Generative Artificial Intelligence (GenAI) for research, teaching, and business practice. We provide a starting point in this editorial, and explore some opportunities and threats of GenAI, including ideas for future research projects in that space.

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[1] For more statistics on ChatGPT and OpenAI, see https://www.demandsage.com/chatgpt-statistics/.

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0167-8116/

2. ChatGPT and IJRM

There are two important updates of our editorial policy. First, although we see ChatGPT (and other forms of GenAI) as an interesting tool for researchers, we do not accept any form of AI as coauthor. The straight-forward reason is the lack of accountability. Second, we do not accept authors using output 1:1 from ChatGPT in their manuscripts without proper citation. Similar to other journals (e.g., see the recent editorial by *Science*, Thorp, 2023), we interpret this as plagiarism and thus a severe misconduct not unlike the act of copying material from others without appropriate referencing. In short, work generated by AI cannot be considered original work of the submitting authors.

Of course, we are not against the use of GenAI tools in research (it is quite the contrary, as evidenced in this editorial). However, as scientists we need to be transparent and honest in reporting the tools we use. Thus, we require authors upon submission to clarify in their manuscripts, wherever appropriate, if and how GenAI tools have been used. Tools such as Grammarly can aid researchers in crafting their exposition. This reflects a fairly restricted use of GenAI, the results of which can be evaluated by the researcher with relative ease. In cases where GenAI is being used more extensively, it is critical that users first familiarize themselves with the tools' promises and pitfalls. ChatGPT, for example, stopped its training in 2021 (Ruby, 2023). Thus, research that has appeared later might get unnoticed (which might be highly relevant for an up-to-date literature review). Second, ChatGPT does not provide references to the work the generated text builds on (unless the prompt explicitly calls for references).[2] Furthermore, van Dis, Bollen, Zuidema, van Rooij, and Bockting (2023) report a test of ChatGPT's accuracy of summarizing key findings of specialized research areas (e.g., prompt: 'how many patients with depression experience relapse after treatment?'). Findings reveal that the chatbot often generated false and misleading text. Even more alarmingly, when prompted to summarize a given review article, "ChatGPT fabricated a convincing response that contained several factual errors, misrepresentations and wrong data" (van Dis et al., 2023, p. 224). Thus, as of now, it does not seem prudent to rely on ChatGPT output to review the extant literature without careful reflection and some form of human verification. That is, we need to maintain the "human in the loop."

3. Broadening the scope of the discussion

In the remainder of this editorial, we broaden the scope of our analysis beyond the present time, the journal, and ChatGPT. In particular, we reason that what we are seeing with ChatGPT is likely only the tip of the iceberg. There are other forms of GenAI that are available and/or will be available in the near future. The common element of GenAI tools is the generation of seemingly intelligent output in response to a human-provided prompt, including text, code, simulations, images, 3D objects, and videos. Here are some examples for GenAI tools that are already available in at least beta versions[3]:

- Magic Write (embedded in Canva Docs) generates text in response to some human-provided prompt.

Looking for some words of inspiration to kickstart your creative process? Magic Write in Canva Docs is your very own AI text generator to help you get out a first draft, fast. Simply start with a prompt and watch as copy, blog outlines, lists, bio captions, content ideas, brainstorms, and more appear in seconds. https://www.canva.com/magic-write/

- Eleven Labs transforms text into audio.

Generate top-quality spoken audio in any voice and style with the most advanced and multipurpose AI speech tool out there. Our deep learning model renders human intonation and inflections with unprecedented fidelity and adjusts delivery based on context. https://beta.elevenlabs.io/

- DALL·E 2 (https://openai.com/dall-e-2/), Midjourney (https://midjourney.com/home) and Stable Diffusion (https://stability.ai/blog/stable-diffusion-public-release) generate images, graphics, art, etc. from a description in natural language.

- Channel analyzes your data and provides visualizations in response to some human-provided prompt.

Ask any data question, in plain English. Get the answers you need without knowing SQL. Self serve your data insights, finally. No matter how complex your warehouse, Channel learns how to get the answers you need from just plain English. Beautiful visualisation. Channel automatically generates beautiful visualisations for your data, and picks the right chart type based on your preferences. Self service, for real. Channel is designed to be used by anyone, from analysts to product managers. No more waiting for the data you need. https://www.usechannel.com/

[2] Even if the prompt calls for references, the accuracy of the references provided has been found to be of questionable quality by several peer scholars we interviewed on the topic.

[3] For more examples, see https://www.worklife.news/technology/ai-workplace-tools/.

Table 1
Implications of Generative Artificial Intelligence (GenAI).

Generative Artificial Intelligence (GenAI): What it is? The common element of GenAI tools is the generation of seemingly intelligent output in response to a human-provided prompt, including text, code, simulations, images, 3D objects, and videos. Current examples comprise ChatGPT, Magic Write, Eleven Labs, DALL·E 2, Midjourney, Stable Diffusion, and Channel.

Implications and Questions for...

Research	Teaching	Marketing Practice	Intellectual Property
• For what type of research task can GenAI tools credibly be employed using what type of best practice? • What are the biases of GenAI tools and how can we effectively cope with them? • How can researchers develop effective prompting strategies? • What are the psychological differences and ultimate performance implications (efficiency, effectiveness, creativity, etc.) of going about certain tasks with versus without GenAI tools? How is this affected by the researchers' prompting strategy? • How can GenAI help researchers in the fuzzy front-end (i.e., identify promising research questions that are likely to work empirically)? • What are the implications for the advancement and equality of science?	• How can we safeguard that a given assignment (e.g., report, essay, SWOT analysis, etc.) is based on original work of the student rather than simply being the output of GenAI? • How can we manage an active discourse with students, including an explicit discussion of how to use GenAI with integrity, transparency, and honesty, and how should this be included in the university's code of conduct? • How can we train students to effectively use the tools in solving real-world marketing problems? • How can "prompt engineering" be taught and learned? • How can we develop skills to effectively evaluate the output of GenAI in terms of its impact on relevant metrics and cope with the inherent limitations of relying upon GenAI?	• What are the opportunities and threats of GenAI for marketing practice, and what will be the tools' impact on how the marketing industry operates? • For what type of task can we expect positive (vs negative) effects on performance (efficiency, effectiveness, creativity, etc.)? • What are the implications for job requirements, productivity, and job satisfaction? • Under what conditions can GenAI tools help democratize marketing, business, and cultural activities more broadly? • How can GenAI help to accelerate existing marketing strategies (e.g., mass customization, crowdsourcing) and how can it engender new ones? • In how far does GenAI disrupt the role expertise and firms more broadly play in market exchange settings (value creation, consumer welfare, etc.)? • How does GenAI affect creativity and problem-solving processes and what are the promises and pitfalls?	• What are the implications of GenAI for intellectual property protection, copyright and patent laws across the globe? • Who should be protected, to what extent, and based on what ground and argument (e.g., the fair use doctrine, and relatedly, the concept of transformative use might be relevant)? • To what extent does a human get credit for having created a piece of art with the help of GenAI? What are the contingencies and psychological mechanisms (e.g., does the degree of human involvement matter)? • Do the focal perceptions differ between those who create the designs and those who evaluate them? Relatedly, do all evaluators and observers react similarly or are there systematic differences (e.g., between lay consumers and experts) and what are the implications for intellectual property protection?

Furthermore, both Google and Meta are working on text-to-video AI generators with prototypes already having made its way to the public.[4] What are the implications of GenAI for research, teaching, and marketing practice more broadly? We discuss each of these areas next (see Table 1 for an overview).

4. GenAI and research

It seems likely that the diffusion—and continuous improvement—of GenAI tools will change the way research is performed and evaluated. As we move forward in this direction, it is important to continuously monitor and conduct research on the tools themselves.

For what type of task can GenAI tools credibly be employed using what type of best practice? As indicated, van Dis et al. (2023) point to the risks of using ChatGPT when summarizing key findings of specialized research areas. Interestingly, however, these authors also report that merely repeating their query generated more detailed and accurate answers. Thus, more research is needed to better understand the reliability and validity of using large language models (LLMs) in assisting human researchers and to develop recommended procedures of using (and reporting the use of) these tools.

Relatedly, given that LLMs are trained on digital data (e.g., Berger et al., 2020), it is critical for researchers to understand the unintended biases that are hard-coded into these models. Research is needed to create more transparency around biases such as sexism, racism, and ageism. This may impact the machine-generated output of tasks such as literature reviews and other tasks. As noted by Rich and Gureckis (2019, p. 174), "Artificial intelligence and machine learning systems are increasingly replacing human decision makers in commercial, healthcare, educational and government contexts. But rather than eliminate human errors and biases, these algorithms have in some cases been found to reproduce or amplify them." In their research, they examine several causes of bias from the human domain that are also relevant for GenAI, including "small and incomplete datasets, learning from the results of your decisions, and biased inference and evaluation processes." Beyond

[4] For example, see https://www.youtube.com/watch?v=SHDgMU-M3f0&feature=youtu.be.

documenting the existence of these biases, there is an opportunity for marketing researchers to develop guardrails that will minimize the effect of the biased data on which these LLMs were built.

Another interesting area for future investigation is the development of skills to ask the right prompts. It seems likely that different prompting strategies might exist, yielding different outputs and hence potentially different conclusions on the part of the human researcher. Furthermore, it might be interesting to explore the psychological differences, and per consequence, the ultimate performance implications of going about certain tasks with versus without GenAI tools. Can the use of GenAI help researchers to work more creatively by, for example, breaking functional fixedness? Does GenAI help researchers to more easily identify and get stimulation from analogous research fields (Dahl & Moreau, 2002; Franke, Poetz, & Schreier, 2013)? How is this affected by the researchers' prompting strategy?

Maybe a bit more in the distant future, how can GenAI help researchers identify promising research questions? There are two aspects that make the identification of "good" research ideas difficult. First, the idea should be novel, innovative, and disruptive from both a theoretical and practical perspective. Second, it needs to work empirically. The advancement of empirical research fields might be accelerated substantially if the tedious mining of the solution space by human brain and hand could be effectively assisted by GenAI, akin to the use of big data for idea generation proposed by Toubia and Netzer (2016). As an exemplar, consider the concept of groundedness (a feeling of emotional rootedness), which has been recently introduced into the marketing literature (Eichinger, Schreier, & van Osselaer, 2022). Although the initial inquiry points to positive effects of groundedness for consumers and brands, we currently know very little about how this construct is (vs is not) related to other, business- and/or consumer-relevant variables in the bigger network of the marketing universe. From a researcher perspective, it would be very tempting to provide some prompts to a GenAI tool with the hope to be served some high-impact research questions, or initial research hypotheses that are likely to work.

Finally, GenAI might be a promising tool to speed up the reporting of one's research. Senior scholars know how critical—and time-consuming—the writing of each paper is (writing successful marketing papers for top journals is often compared to craft that takes time to master and is hard to be put to scale). At the same time, there are many similarities between papers and studies that could be leveraged by GenAI. Consider reporting behavioral experiments as an example. While the core of a given study's contribution is the idea and the supporting data, writing it up takes time and may prove difficult for inexperienced authors. Working with an effective GenAI tool in that space might yield substantial time savings and, in addition, could add to more equality for researchers across the globe (e.g., researchers with weak English skills embedded in distant, disadvantaged institutions might benefit the most). In addition, GenAI could aid researchers in disseminating their work to a broader audience, translating the academic lingo to more conversational style.

5. GenAI and teaching

Perhaps even more intense than the research-related implications, are the extensive discussions that university faculty are having around how to respond to the emergence of ChatGPT (and other forms of GenAI) as it pertains to teaching students and assessing their performance. If text produced by GenAI tools cannot be reliably detected by conventional plagiarism checkers used by universities, as suggested by the study by Gao et al. (2022) mentioned above, how can we safeguard that a given report, essay, or SWOT analysis is based on original work of the student rather than simply being the output of GenAI? Gao et al. (2022) point to the possibility to use AI output detectors, which in their study effectively identified the AI-generated (vs original) abstracts. But, as GenAI matures and there are more tools on the market, building reliable AI output detectors may become a game of cat-and-mouse. Detecting AI output is only one side the coin, the other being an active discourse with students, including an explicit discussion of how to use GenAI with integrity, transparency, and honesty (see also van Dis et al., 2023), and its related inclusion in the university's code of conduct.

A more progressive way to think about how higher education adapts to this disruption to the status quo is to ask ourselves how we can incorporate GenAI into how we train students to effectively use the tools in solving real-world marketing problems (see also Mollick & Mollick, 2023 for a discussion of how AI may be used more generally to effectively implement evidence-based teaching strategies). After all, business education should prepare today's students for the jobs they will have upon graduation, which includes being well-versed in how to use the latest technologies on the market. As an analogy, consider the emergence of statistical software programs. Instead of spending time in class explaining the formulas behind T-, F-, and Chi-square tests, for example, which students then had to apply by hand during exams, professors could start spending more time on when the different tests are appropriate, how to interpret the output, and what the implications of the results are. We should view GenAI no differently: as a technology that will be available on the market and that our students should be trained to use. For the effective use of GenAI tools, this should include learning about effectively crafting prompts (a practice referred to as "prompt engineering"), how to evaluate the output of GenAI in terms of its impact on relevant metrics, and the inherent limitations of relying upon GenAI. For example, Reisenbichler, Reutterer, Schweidel, and Dan (2022) showcase how GenAI may support marketers in their search engine optimization (SEO) efforts by generating text for the landing page of a website. As the authors note, however, it is essential that the human editor remains in place to rectify factual inaccuracies and ensure a tone consistent with the brand.

Schweidel, Reisenbichler, Reutterer, and Zhang (2023) offer a discussion of other ways in which GenAI may be used to support marketing operations, which may offer a guide to different ways in which the technology can be infused into the training of students to produce marketing content. In addition to LLMs that can produce text for a variety of applications

such as paid search, social media posting, and online reviews (Carlson, Kopalle, Riddell, Rockmore, & Vana, 2023), GenAI can be used to produce visual content. While image generators such as Stable Diffusion and Midjourney can convert textual prompts to remarkable visuals, they are not designed with a specific marketing purpose in mind, such as driving online engagement or moving customers down the purchase funnel. How such tools can be combined with predictive models remains not only an area for future work, but also a topic that must be conveyed in training.

6. Implications for marketing practice

Just as GenAI should transform the way in which we prepare the next generation of marketing professionals, it will also have a profound impact on how the marketing industry operates. Ma and Sun (2020) discuss the potential to apply AI in marketing. Already, we are seeing the emergence of prompt engineering as a skill set being sought be agencies and brands. Effective prompt engineering can facilitate ideation, as well as allow for the exchange of fleshed out ideas among different team members. Reisenbichler et al. (2022) demonstrated the potential for GenAI to not only improve the performance of marketing content, but also to significantly reduce the marketing costs. Noy and Zhang (2023) similar reported that tasks took less time and that output was of a higher quality. But it is not just productivity that will increase. Users of GitHub's CoPilot coding GenAI reported both increased productivity *and* increased job satisfaction with coding tasks (Kalliamvakou, 2022).

As businesses seek to produce desired business outcomes more efficiently, it is hard to imagine an aspect of marketing practice that will not be touched by GenAI. In a way, GenAI may help to democratize marketing. For example, start-ups, small companies, single entrepreneurs (e.g., artists, craftspeople, influencers, etc.), non-profit organizations and charities, as well as firms from the bottom of the pyramid might all benefit from GenAI. The ability to develop personalized communications for fundraising or sales materials designed for specific personality types is within reach. As with any new tool, the efficacy of new approaches to developing marketing content need to be rigorously evaluated and examined in a range of contexts.

Similarly, GenAI may democratize business and cultural activities more broadly. As pointedly illustrated by DALL·E 2, for example, GenAI "will empower people to express themselves creatively" (https://openai.com/dall-e-2/). The critical aspect being that GenAI, by dramatically reducing the entry barriers to perform creative activities, may soon allow also nonexperts without pertinent training to create a novel, a song, a design for a chair, a sculpture, a painting, a video game, etc. User innovation as a phenomenon (cf. Von Hippel, 2006) may thus be spurred dramatically, given the execution of one's ideas is not a bottle neck anymore. In tandem with recent advancements in the area of 3D printing, for example, also mass customization as a business model and research area (cf. Moreau, Prandelli, Schreier, & Hieke, 2020) may spur. Interesting research questions will come hand in hand with the emergence of GenAI tools in that space. For example, in how far does the design process per se (text-to-design vs more conventional self-design) affect the outcome (design) and value it delivers to the individual customer (willingness-to-pay)? It seems likely that potential positive effects are more pronounced for novice (vs expert) users, thus markedly increasing the potential market for customized products.

GenAI may also boost a firm's crowdsourcing efforts (cf. Nishikawa, Schreier, Fuchs, & Ogawa, 2017). To visualize, while it may be easy for a consumer to suggest a new flavor for a snack or the name for a new product, it is more difficult to come up with an innovative design for a couch or create the logo or packaging design for a given product. With the help of GenAI, more users may generate more promising ideas for seemingly more difficult tasks at a faster pace. It will be interesting to better understand how specifically technology may change the number and quality of submissions, the time required to perform a given task, and hence the incentives needed to motivate participation.

Relatedly, research may also more fundamentally challenge the role expertise, and perhaps per consequence even firms, play in bringing winning new products to market. We know that consumers may at times have better ideas for new products than professionals employed within companies (cf. Nishikawa, Schreier, & Ogawa, 2013). If the translation of ideas into a tangible product, and its potential production at scale, is not a severe limitation anymore, what does this imply for firms and users? What are the implications for markets and welfare more broadly (cf. Gambardella, Raasch, & von Hippel, 2016)?

Finally, the emergence of GenAI may also provide new questions for the theory and practice of creativity and innovation management (cf. Bouschery, Blazevic, & Piller, 2023). How can experts benefit from the related tools and what are the downsides to monitor? To what extent, and how specifically, can GenAI boost human creativity? As noted in the discussion on research above, maybe it is an effective way to break functional fixedness and cope with local search bias? Under what conditions might we expect backfiring effects? Consider professional cooking as an example. Already in 2015, IBM, together with the Institute of Culinary Education, published a book entitled "Cognitive Cooking with Chef Watson," in which they report how IBM's early GenAI tool, known as Watson, has been trained to identify "surprising, never-before-seen dishes," including innovations such as Creole Shrimp-Lamp Dumplings. As they argued, "when it comes to thinking outside the box, even the best chefs can be limited by their personal experiences, the tastes and flavor combinations they already know [...]. Great chefs might know and draw upon several thousand of these pairings, but considering the vast universe of available ingredients, the number of all possible combinations must certainly be in the trillions, or beyond" (IBM and Institute of Culinary Education, 2015, p. 6 and p. 9). In how far can humans benefit from using GenAI to effectively mine the solution space? What are the related performance implications? What are the skills needed to perform well in a world assisted by GenAI? Do we need to look for different people, train different skills, and provide different types of incentives to acquire the "right" talent?

7. Implications for intellectual property

With the emergence and diffusion of GenAI tools comes naturally also a discussion of intellectual property and the related implications for copyright and patent laws across the globe (cf. van Dis et al., 2023, Merkley, 2023, Vincent, 2022). In particular, GenAI is often trained on data that is not owned by the companies that market the tools. As such, it is hardly surprising that lawsuits are emerging accusing the firms behind the GenAI tools for misusing others' work. For example, according to *Reuters* (Brittain, 2023a), groups of individuals and companies like Getty Images have suit or initiated legal proceedings against AI companies for copyright infringements, showcasing that writers, artists, programmers, and other creators are concerned that said AI tools are "trained on vast amounts of copyrighted work with no consent, no credit, and no compensation." As discussed by Merkley (2023), the answer to these matters, amongst others, will likely depend on a case-based interpretation of the fair use doctrine in that space (and relatedly, the concept of transformative use).

Another question mark is how to deal with the outcome of GenAI: the products and designs that result. How can the related intellectual property be protected and who should be protected in the first place—and to what extent? On the one hand, as put forth in another *Reuters* article on the topic (Brittain, 2023b), using GenAI to create an image or illustration to be used in a book, for example, cannot be considered a "product of human authorship" and "therefore cannot be copyrighted." On the other hand, as described above, there is some human element involved via prompting. Indeed, counsels of AI firms, cited in the *Reuters* article, have pointed to the notion that "if an artist exerts creative control over an image generating tool [...] the output is protectable." We believe that consumer researchers and psychologists in particular, using rigorous behavioral experiments, might shed important light on related questions. For example, to what extent does a human get credit for having created a piece of art with the help of GenAI? What are the contingencies and psychological mechanisms? Should the ability to copyright the output of GenAI depend on the degree of human involvement, as suggested by Vincent (2022)? Relatedly, what are the structural differences to other forms of impure creation? What is the difference to using conventional tools and software programs, ghostwriters, or employees who follow and execute the directions of the lead artist's ideas? To what extent do the focal perceptions differ between those who create the designs and those who evaluate them? Finally, do all evaluators and observers react similarly or are there systematic differences (e.g., between lay consumers and experts) and what are the implications for intellectual property protection?

8. Conclusion

We hope that this editioral will stimulate research questions and empirical projects that help us better understand the implications of GenAI for marketing research, teaching, and business more broadly. In the spirit of IJRM's positioning (see Schreier, Peres, Schweidel, & Sorescu, 2021), we will be excited to receive related manuscripts reporting empirical work on the topic.

Data availability

No data was used for the research described in the article.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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