

Using Generative AI to Spark Creativity in Marketing: Through the Lens of Open Innovation

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Fostering and encouraging creativity is important at every level of an organization. For example, an IBM survey of over 1,500 CEOs found that 60% considered creativity to be the most important leadership quality, even above integrity and global thinking.ⁱ With the rapid development and adoption of generative artificial intelligence (genAI) tools such as ChatGPT and DALL-E, one of the most exciting potential areas of application is sparking creativity in business innovation.

How can individuals and firms harness the power of genAI to enhance creativity in ideation and product design? What are some possible drawbacks or caveats to the use of genAI tools? In this report, we focus in particular on the usage and potential impact of genAI within the context of *open innovation*. Firms and organizations are increasingly turning to crowdsourcing or open innovation contests to generate new ideas and problem solutions. This report first reviews the current ecosystem of open innovation settings and provides examples of the genAI tools that may be applicable to different problems within marketing and related business areas. We then outline several strategies that have been proven to foster creativity and idea generation within traditional settings and look at examples of how these strategies can be extended to incorporate genAI. Finally, we review some examples from the latest research that demonstrates the pros and cons of genAI within specific use cases, as well as additional challenges that may arise.

An important clarification is that while the focus of this article is on the impact of genAI on open innovation contests, the results we discuss are not necessarily limited to open innovation and in fact may also be highly relevant to firms' internal operations. We focus on prior examples and research within open innovation contests because they provide a window into the innovation and creativity needs and processes of firms, whereas more traditional closed innovation processes are kept internal or proprietary. Academic researchers often study open innovation contests since they provide a useful testbed for experimenting with different factors that may hamper or help inspire creativity in idea generation.

Open Innovation Contests

Within the last decade, many firms have increasingly turned to crowdsourcing as a way to generate fresh ideas for a variety of applications through online competitions. These contests involve firms soliciting ideas and problem solutions from the external community and are often referred to as "open innovation," a term first coined by Berkeley Haas Professor Henry Chesbrough.ⁱⁱ Open innovation contests effectively democratize the innovation process and present a departure from the standard "closed innovation" idea generation process that occurs internally among the employees of an organization.

One high-profile instance of open innovation success occurred in 2009, when Netflix awarded a \$1 million grand prize to the BellKor's Pragmatic Chaos Team, who were able to beat Netflix's

existing algorithm for predicting user movie ratings by over 10%.ⁱⁱⁱ There are countless other examples of firms and organizations, including LEGO^{iv} and NASA,^v that have held successful innovation competitions. In addition, many online platforms have popped up to facilitate crowdsource competitions by firms for all manner of marketing and product design needs. Some platforms are more design-focused. For example, on websites like Crowdspring.com and 99designs.com, participants can submit their design ideas for logos, product names, book covers, and business cards. Other platforms host contests for more broad “high-level” business ideas. For example, OpenIdea.com and Hyvecrowd.com host competitions for firms seeking new ideas for product applications, sustainability, education, healthcare, and entrepreneurship. Herox.com features a variety of challenges across different topics with prizes ranging from hundreds to millions of dollars for solutions posed by companies to propose ideas and solve problems ranging from logo design to smart city design to solar power innovation.

It is easy to see how genAI tools such as ChatGPT might quickly become a go-to brainstorming aid for participants of these challenges (and of course for employees involved in firms’ internal creative streams). Currently, the most plausible applications of genAI are the more straightforward contests asking for relatively simple ideas such as designing a new logo or defining the must-have features of an existing mobile app. For example, using an AI art generator Dall-E Mini and entering in the prompt “Logo for Carnegie Mellon University with the Scotty Dog mascot” gives us a logo (see Figure 2 left panel) that is quite close to the desired output (although the dog appears to be a Corgi rather than a Scottish terrier) for one iteration, but quickly deviates when a different art style is requested (see Figure 2 right panel).

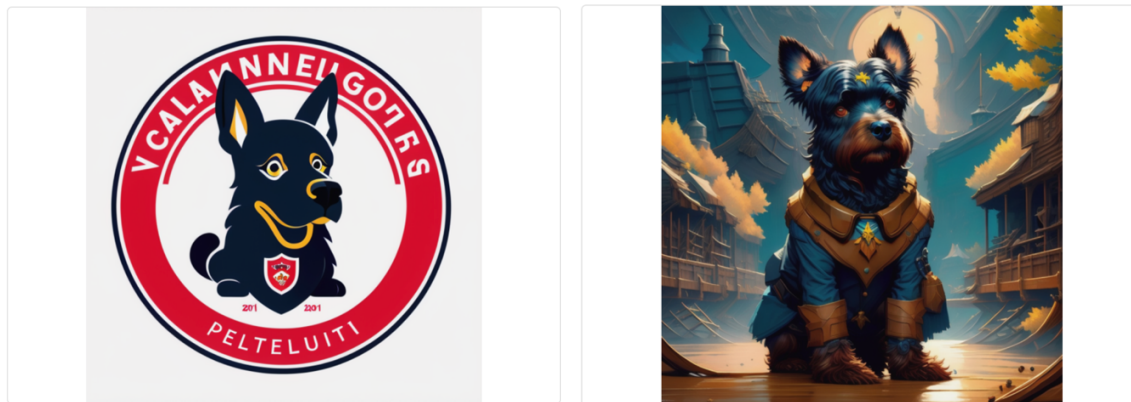


Figure 2: DALL-E Mini images generated in response to the prompt “Logo for Carnegie Mellon University with the Scotty Dog mascot”

GenAI can be quite limited when it comes to highly technical contests such as designing new engineering solutions that would require teams of experts to properly execute. However, that is not to say that it’s impossible for genAI to come up with ideas for more high-level problems. For example, one challenge featured on Herox.com was held by Ethicsnet.org, who offered \$10,000 in prize money for the best ideas in response to “How would you teach AI to be kind?”^{vi} The winning entry proposed creating a system that allowed for an AI to receive human input to learn appropriate behavioral norms, in order to generate a body of ethical data that could be used to train additional AI systems. As shown in Figure 2, prompting ChatGPT with a similar question

produces similar ideas involving the creation of an ethical dataset and human feedback. Similar to the CMU logo example, there is a need for some human-in-the-loop fine-tuning to create a viable contest entry.

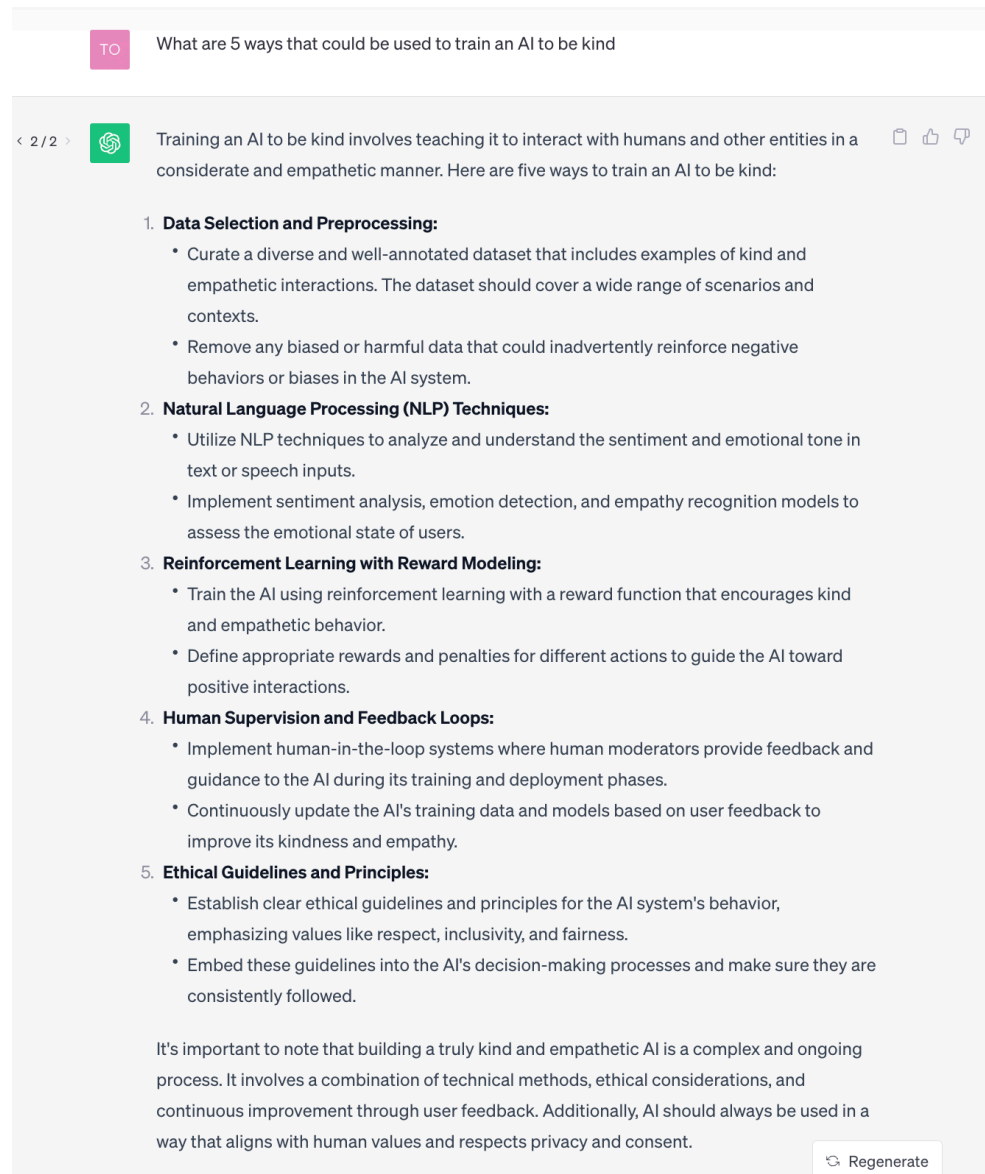


Figure 2: ChatGPT-3.5 response to the prompt of “How would you teach AI to be kind”

Currently Available GenAI Tools for Idea Generation

While the origins of genAI started with large language models (LLMs), genAI tools have the ability to provide output across a variety of a mediums beyond text, including image, video, and audio. Table 1 provides (a small) set of examples from each of these mediums from the broader ecosystem, as well as examples of specific business applications, with an emphasis on those related to marketing. For example, tools for generating text such as ChatGPT may be used to generate ideas for more structured deliverables such as slogans or email headlines, but can also

be useful in open-ended ideation. Similarly, genAI can produce images for final outputs such as logos and ad creatives, as well as more abstract applications such as rendering and visualization. Finally, a less discussed area is in audio generation, with interesting possibilities for genAI to create music for a variety of settings.

	GenAI Tools	Business Applications
Text	ChatGPT Jasper Writesonic Copy.ai Bard	Slogans Email headlines Social media content Product descriptions Open-ended ideation
Image & Video	Midjourney Dall-E Stable Diffusion Synthesia Adobe Firefly	Logos and branding Ad creatives New product design Webpage design Rendering and visualization
Audio	Amper Music Otter.ai SoundRaw Soundful Amadeus Code	Creating royalty-free music Soundtracks for games, movies, podcasts, etc.

Table 1: Examples of genAI tools for text, image & video, and audio mediums, as well as relevant business applications

An important caveat to keep in mind is that currently the content created using genAI can be used for any purposes without the need for license or copyright, but also can be used by others.^{vii} In general, ownership of content created by genAI is unclear, with the further complication that the datasets the models have been trained on usually contain copyrighted materials.^{viii}

Strategies for Fostering Creativity and Idea Generation

Given the importance of creativity for business innovation, many firms are invested in understanding how to boost creativity among employees. For example, should firms offer monetary rewards for creative output? Should firms offer training programs to boost creativity?^{ix} How does genAI fit into these strategies? Here we highlight four research subareas in the study of fostering human creativity and discuss how they may inform the incorporation of genAI tools into the ideation process:

(1) *Electronic Brainstorming*: One of the most widely-used methods for facilitating creative idea generation is group brainstorming. The idea is that putting people together can result in synergies

that then fuel greater creativity compared to if those same people worked alone. Brainstorming is not restricted to face-to-face interaction – researchers have also documented the effectiveness of “electronic brainstorming,” which seems to increase productivity and satisfaction over and above face-to-face interaction and working alone.^x Specifically, the benefits of electronic brainstorming arise from everyone in the group being able to voice their ideas simultaneously (e.g., within a chatroom or shared Google doc) without having to wait their turn like in face-to-face interaction, being able to maintain some form of anonymity, which reduces sharing anxiety, and all ideas being saved in digital form for later recall. These benefits are all clearly present in settings where genAI is used as a brainstorming partner.^{xi}

(2) *Cognitive Stimulation*: There is a close positive association between people’s use of mental imagery or ability to engage in visualization with creativity.^{xii} Thus, another potential strategy for sparking creativity is through visualization or other forms of cognitive stimulation. There is also evidence that cognitive stimulation through idea sharing can increase the novelty of one’s own generated ideas.^{xiii} On the flip side, studies have also shown that seeing the ideas of others can potentially hamper creativity. For example, open innovation contests often post previously-submitted ideas that all participants may access freely, but there is evidence that people’s creative performance decreases with the number of existing ideas that they are exposed to.^{xiv} Thus, an open question to be explored is whether (and in what situations) genAI benefits user creativity via cognitive simulation or limits people from coming up with their own novel ideas.

(3) *Strategic Constraints*: We often think of constraints as bad for creativity. For example, conventional wisdom would suggest that having more resources is better, whether the resources come in the form of money, information, or inspiration. However, researchers have discovered a more nuanced relationship between resources and creativity. Specifically, the availability of resource “slack,” defined as excess resources within an organization (e.g., redundant employees, unused capacity, excess capital, etc.) may be helpful for innovation at low levels by promoting experimentation, but detrimental at high levels by allowing for complacency and lack of discipline.^{xv} Similarly, other types of resources vs. constraints are best in moderation. Setting minor constraints within creative challenges can steer participants away from the most obvious or familiar answers and encourage them to explore novel ideas.^{xvi} The usage of genAI may be a positive constraint if used as a starting point for idea generation, or it could potentially hamper creativity if used in excess. Alternatively, users may consider the best way to design constraints for the genAI itself via prompt engineering to produce the most helpful responses.

(4) *Novices vs. Experts*: Finally, it is important to consider how creativity-sparking strategies can differentially impact people of different levels of domain expertise. For some of the biggest open innovation contests, such as those hosted by Netflix and NASA, it is clear that some (high) baseline level of expertise is required to even begin tackling the solution to a challenge. On the other hand, researchers have found that as people gain domain expertise, they may lose flexibility when it comes to creative idea generation. This suggests that access to genAI tools may impact novices vs. experts in different ways. Furthermore, studies have shown that novices and experts differ greatly in the way they tackle problems, including the way that they use widely accessible tools like internet search.^{xvii} These differences may extend to the way that they interact with and utilize genAI as well.

Some Initial Pros and Cons

There is no doubt that genAI will see widespread adoption within the next decade across a variety of business applications. While there has been quite a bit of algorithm *aversion* in areas within decision-making contexts with objectively “correct” answers (e.g., event forecasting, medical decision-making),^{xviii} we are not seeing the same pushback for the usage of genAI. This could be in part due to the wider degree of user accessibility of these tools, the lower stakes of the various applications, the lack of having to commit to a particular “right answer” or decision (i.e., using genAI for brainstorming rather than decision-making), or perhaps simply that we are still in the initial exploratory stages of this technology.

Curiously, areas where there is widespread algorithm aversion are also the areas where algorithms have been shown to consistently outperform even expert humans, including in clinical exams^{xix} and legal analysis.^{xx} In contrast, there is mixed evidence regarding the effectiveness of AI in creative applications in terms of generating an end-product that is “better” than purely human-created products.

For example, human experts have been found to outperform AI logo makers due to human-created logos being more expressive and differentiated.^{xxi} A recent study comparing ideas generated by humans vs. GPT-4 for a crowdsourcing challenge on sustainable, circular economy business ideas found that human-generated ideas were more novel, while AI-generated solutions delivered better environmental and financial value.^{xxii} Generative models (i.e., GANs) have also been used to create car designs that are appealing to consumers.^{xxiii} Thus, while simply adopting genAI can be easy, the next steps of utilizing it in effective ways and demonstrating its value in terms of creativity in business applications will be both extremely interesting and challenging.

Continued research in understanding the strengths and weaknesses of human vs. AI creativity and idea generation may inform the best way for genAI to be incorporated into product design pipelines. Given the rapid development of genAI tools, the study of how people incorporate AI in creative idea generation and product design is still in its nascent stages and will likely prove to be a fruitful and exciting area of business application and research.

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ⁱⁱ Chesbrough, H. (2006). Open innovation: a new paradigm for understanding industrial innovation. *Open innovation: Researching a new paradigm*, 400, 0-19.

ⁱⁱⁱ Jackson, D. (2017). The Netflix prize: how a \$1 million contest changed binge-watching forever. *Thrillist*. <https://www.thrillist.com/entertainment/nation/the-netflix-prize>.

^{iv} Schlagwein, D., & Bjorn-Andersen, N. (2014). Organizational learning with crowdsourcing: The revelatory case of LEGO. *Journal of the Association for Information Systems*, 15(11), 3.

^v Gustetic, J. L., Crusan, J., Rader, S., & Ortega, S. (2015). Outcome-driven open innovation at NASA. *Space Policy*, 34, 11-17.

^{vi} <https://www.herox.com/EthicsNet/teams>

^{vii} <https://www.findlaw.com/legalblogs/legally-weird/who-owns-dall-e-images/>

^{viii} <https://www.computerworld.com/article/3705928/us-copyright-office-opens-inquiry-into-laws-needed-to-rein-in-genai.html>

- ^{ix} Research shows that monetary rewards may undermine the creative process, but works well if paired with creative training, see Burroughs, J. E., Dahl, D. W., Moreau, C. P., Chattopadhyay, A., & Gorn, G. J. (2011). Facilitating and rewarding creativity during new product development. *Journal of Marketing*, 75(4), 53-67.
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