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Google Bard as a co-author in writing an article

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Contribution to

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Artificial Intelligence Tools: A Wealth of Intelligence and Nothing Artificial. Seniors 55+ Using Artificial Intelligence (AI) Tools: Lessons Learned and Best Practices Exchange

At the end of 2023, I received an invitation to write an article for a special edition of the Law and Business Journal on the topic of Innovation. Innovation has never been my research area, but one of the editors thought that my research ideas were quite innovative and therefore I could definitely write an article about it.

I thought of my many years of research in the field of automation of construction progress monitoring and the many published solutions, among which the degree of innovation is quite different. In the article, I wanted to analyze the innovation levels of some typical solutions, but my knowledge of the scientific field of innovation was very limited. So I decided to help myself with the latest version of Google Bard.

Bard is a conversational generative artificial intelligence chatbot developed by Google. Initially based on the LaMDA family of large language models, it was later upgraded to PaLM and then to Gemini. The initial release date was March 31, 2023, while the latest release was February 1, 2024. It can be freely used as a web application at <https://bard.google.com/chat>.

My first request for Bard was: *Elaborate on the science of innovation. Include examples of scientific breakthroughs that led to innovation. Also include challenges to Innovation.*

A further request was to *Include in-text citations and give a reference list at the end. Use Chicago citation style.*

Three draft answers were given, each meaningful, well structured and understandable, with citations and a list of references in the required style. At the end of each draft, the possibility of evaluating the answers was given, as well as the possibility of their modification, namely to make it shorter, longer, simpler, more casual or more professional. I did try some options

and the drafts changed accordingly, but not always for the better. Through several iterations, the text was finally acceptable for inclusion in the article.

However, the question arose of how to indicate the Bard's co-authorship. Bard answered sovereignly: *As a large language model, the concept of co-authorship isn't directly applicable to me in the same way it is for human authors. However, there are several ways you can acknowledge my contribution to your work, depending on the nature of my involvement.*

Of course, three answers were offered again, each time in a bit different manner. I suggest you try to ask Bard yourself. The technical question of how to cite the co-authorship of an artificial intelligence system is of course not crucial. The question of the manner, sense and ethics of using artificial intelligence answers, however, is.

One important aspect is checking and improving answers. AI systems can help us a lot in gathering, sorting, and summarizing information, but we need to have a certain level of knowledge about the field ourselves, otherwise the answers can lead us astray. We never know how a certain AI system gathered knowledge and how it formed its neural networks.

Incorrect or misleading results that AI models generate is known as AI hallucination. This is why verification is so important. In the case of the mentioned article, I also checked the references and found that about a third were made up, so they didn't exist at all. Bard "composed" them from existing researchers names and meaningful titles, but they were never published.

I used Bard in my article for yet another reason, because the use of AI in writing articles is a novelty itself, which served as one of the starting points for defining innovation in my article. Of course, I've marked all of Bard's answers, including references, separately.

Writing an article with the help of Bard was a very special experience for me, whereby my main message is that one should be very, very careful when using AI.