



Generative Artificial Intelligence and E-Commerce

Nir Kshetri¹, The University of North Carolina at Greensboro

This article explores how generative artificial intelligence (GAI) is transforming e-commerce, with major players and startups integrating such applications. It discusses GAI's impact on organizational structure, search costs, and consumer buying decisions.

Generative artificial intelligence (GAI) is poised to bring about transformative changes in the e-commerce industry and market. E-commerce giants such as Alibaba, Amazon, and JD, and startups such as grocery delivery platform Instacart have deployed GAI applications to facilitate e-commerce activities. Noteworthy large-scale retailers have also rolled out similar solutions in the market. In June 2023, French grocery chain Carrefour announced its plan to deploy three solutions based on OpenAI's GPT-4 and ChatGPT: 1) an advice robot to help shopping on [carrefour.fr](https://www.carrefour.fr), 2) description

sheets for Carrefour-brand products that provide detail of every product on its website, and 3) support for purchasing procedures. The chain's ChatGPT-based Hopla helps customers with their daily shopping. Customers can ask for help in choosing products based on budget, their food constraints or menu ideas.¹

Buyers and sellers can harness GAI to effectively address and manage a variety of challenges in their transactions. For instance, online

shoppers are faced with various sources of uncertainty such as those related to vendor, product characteristics, and product fit.² GAI solutions can help reduce such uncertainties. To take an example, in June 2023, Google launched a GAI feature called *virtual try-on tool* for an immersive online shopping experience. It includes various models, sizes, skin tones, body shapes, ethnicities, and hair types. Users can fine-tune their product preferences and explore different options. The tool is powered by Google's internally developed diffusion-based model, aiming to enhance everyday activities like shopping. Initially available to U.S. shoppers with models from brands like Anthropologie, Everlane, H&M, and LOFT, it will expand to other countries soon. Virtual fitting tools can reduce returns by providing users with a clearer understanding of fit and color.³

This article explores the transformative impact of GAI in e-commerce, highlighting how major players and startups have integrated GAI applications. It delves into the implications of GAI on organizing an e-commerce business, search costs, and consumer buying decisions.

GAI AND THE COST OF ORGANIZING AN E-COMMERCE BUSINESS

Human resource (HR) activities are a significant component of organizing an e-commerce business, which can be executed through various means, including specialized professionals, line managers, information technologies, and outsourcing.⁴ Regarding the use of information technologies in performing HR activities, GAI in e-commerce plays a pivotal role in automating and enhancing various HR functions. Data intelligence platform Baselit uses OpenAI's GPT-3 text-understanding model to perform database queries in plain English. The users do not need any coding knowledge.⁵ Baselit can be connected to databases such as Postgres, Snowflake, Redshift, and BigQuery. Users can chat with them to get data insights. The platform can export the results to visualization tools like Tableau, Excel, Google Sheets, and Microsoft Power BI.⁶ The need for employees with coding skills can thus be minimized with GAI.

GAI can also help reduce the need for human resources in functional areas such as customer support and services, sales, and marketing. When consumers simply want to browse an e-retailer's inventory of products, such as shirts, electronics, or snacks, and view them sorted by category, a category page is still the more appropriate tool. Nevertheless, there are occasions when consumers would like to engage with an experienced sales associate and provide them with

a detailed description of what they are seeking.⁷ Several GAI-based solutions are available that perform the task of a customer services or sales associate. At its bi-annual Editions conference, the ecommerce company Shopify announced an expanded set of features under its AI tool Shopify Magic. Shopify Magic can provide answers to merchants' customers based on their conversation histories and store policies. Shopify Magic generates blog post, product descriptions, and marketing e-mail content. A new chatbot-like tool called Sidekick can understand and interpret questions or prompts related to business decision making. The new Shopify Magic capabilities are powered by a combination of Shopify data and large language models like OpenAI's ChatGPT. Leveraging these data and models, Shopify Magic can generate blog posts for events such as holidays, business milestones and campaign ideas. Merchants can customize the tone of voice and translate content into different languages.⁸

The implementation of GAI presents an opportunity to cut costs associated with positions such as content creators, copywriters, and ad editors. For instance, Amazon has launched an AI tool for sellers, which generates product page copy based on keywords or descriptions provided by the seller. The tool can be utilized by sellers to create new listings or improve existing ones.⁹ Sellers can simply provide a brief product description, and Amazon will generate high-quality content for their review. Sellers can refine it or submit it directly to the Amazon catalog, making it easier to create quality listings that enhance customer shopping experiences. Through exposure to various information sources, latent knowledge, and logical reasoning, the models develop the capability to infer product

details. For example, they can make deductions like recognizing a table's round shape when specifications include a diameter or identifying a shirt's collar style from its image.¹⁰ Likewise, China's Alibaba Group's Taobao Wenwen can produce various forms of content, including text, images, videos, and audio, to offer improved product recommendations, such as advice on selecting the right camping equipment.¹¹

By leveraging GAI, businesses can craft customer-centric features that are highly appealing while maintaining a low cost. For instance, JD.com used GAI to create customized product posters for the 618-shopping festival, which is the second-largest and most significant Shopping Festival in China. From June 1 to June 18, the country's e-commerce companies engage in extensive promotional activities and discounts on the latest and most popular products. GAI generated frog images aligned with product characteristics.¹²

EFFECT ON CONSUMERS' SEARCH EFFORTS

GAI drastically reduces consumers' search efforts by streamlining information retrieval, offering tailored recommendations, providing conversational search assistance, and improving visual search functionalities. For instance, when asked to summarize product opinions, Bing collects reviews and employs GAI to condense them into a concise, consensus-driven paragraph.¹³ Customers are no longer burdened with the effort of navigating through hundreds or thousands of reviews to comprehend a product's standout features.¹⁴

Previous studies have noted that it is important to reduce the cognitive costs associated with decision-making, serving as an indicator of decision difficulty.¹⁵ Many GAI solutions have

been launched to reduce such costs and associated decision difficulty. Instead of just searching through a list of recommended products, customers can talk to a virtual assistant, tell it what they need, why they need it, what their budget is, and all the other relevant variables. GAI can give back recommendations of the product that the customer is interested in but other products, services, and content such as how-to videos.¹⁶ To take an example, In May 2023, Alibaba Group-owned Southeast Asian e-commerce company Lazada launched LazzieChat, which is powered by ChatGPT in Azure OpenAI Service. LazzieChat answers users' shopping queries and suggests relevant products or topics. It can also search for item descriptions and link such information to products that are available on the Lazada platform. The program generates answers based on a shopper's needs. There is no need to scroll through several product search results.¹⁷ Using LazzieChat, shoppers thus require substantially less time and cognitive effort to find a product.

Likewise, Zalando, a European fashion e-tailer based in Germany, aims to improve online fashion shopping using a virtual fashion assistant powered by OpenAI's ChatGPT. The solutions to be available on their website and apps enables customers to navigate their extensive inventory more intuitively. The chatbot will respond to customers' fashion-related questions using their own terminology and offer relevant suggestions in a natural and intuitive manner.¹⁸


EFFECT ON BUYING DECISIONS

GAI tools can be used to influence e-commerce consumers' buying decisions. E-commerce buyers often face challenges related to product fit. GAI can effectively address and mitigate these challenges. For instance,

furniture giant Wayfair has introduced Decorify, a GAI tool for testing room designs. Users upload home photos and explore various redecoration styles using Wayfair furniture. As of July 2023, the pilot test covered living rooms. After uploading, users select from eight style options, and the AI transforms the room, replacing furniture and decorations with "shoppable, photorealistic images" linked to Wayfair products for purchase.¹⁹

GAI can also be used to enhance efficiency and strengthen value propositions. For instance, food companies can use GAI to provide fast, reliable, and affordable food delivery to customers at home. In March 2023, grocery delivery platform Instacart announced that it teamed up with Open AI to build an "Ask Instacart" feature powered by ChatGPT.²⁰ The company aims to enhance the conversational aspect of the Instacart App's search function by implementing this feature. Utilizing GAI, the company provides personalized recommendations as customers add items to their intelligent shopping cart. Additionally, Instacart is conducting real-time tests of promotions, including two-for-one deals, to determine their effectiveness. GAI tools thus offer an ecommerce experience that is both personalized and interactive.¹⁶ For instance, GAI can be used to assess customer data to create tailored product recommendations and offers. This involves designing personalized shopping journeys, offering discounts based on past interactions, and generating content that appeals to each customer.²² Tools such as ChatGPT can improve the customer experience by providing timely and accurate answers to various queries and personalized responses. For example, ChatGPT can generate a response regarding the availability of a product and provide detailed information about the expected delivery date.²³

In the absence of sufficiently tailored customization, buyers find themselves dealing with multiple unrelated product options and repetitive information.²⁴ GAI-based solutions have been launched to address such challenges. Microsoft aims to enhance online shopping through GAI in Bing's search engine and the Edge web browser's Bing AI chatbot. Powered by GPT, the chatbot creates personalized buying guides and summarizes reviews.¹³

This article delved into the ways in which GAI tools can potentially affect the e-commerce industry and market. GAI solutions provide a cost-effective means of personalizing offerings and interactions, incorporating AI-driven personalized recommendations and enhanced information search capabilities. In this way, these tools enhance the customer experience. By reducing the costs of organizing an e-commerce business, GAI tools can also create a level playing field for small e-commerce vendors. 

REFERENCES

1. "Carrefour integrates OpenAI technologies and launches a generative AI powered shopping experience." Carrefour Group. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.carrefour.com/en/news/2023/carrefour-integrates-openai-technologies-and-launches-generative-ai-powered-shopping>
2. Y. K. Hong and P. A. Pavlou, "Product fit uncertainty in online markets: Nature, effects, and antecedents," *Inf. Syst. Res.*, vol. 25, no. 2, pp. 328-344, Jun. 2014, doi: 10.1287/isre.2014.0520.
3. T. Sandle. "Google's new generative AI feature is set to impact eCommerce businesses." *Digital Journal*. Accessed: Dec. 1, 2023.

- [Online]. Available: <https://www.digitaljournal.com/business/google-new-generative-ai-feature-is-set-to-impact-ecommerce-businesses/article>
4. D. Ulrich, *Human Resource Champions: The Next Agenda for Adding Value and Delivering Results*. Boston, MA, USA: Harvard Business Review, 1996.
 5. R. Sunil, "The ChatGPT wave: Four startups embracing AI powered chatbot technology," Tucson, AZ, USA: Prompt Engineering Institute, Apr. 4, 2023. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.promptengineering.org/the-chatgpt-wave-four-startups-embracing-ai-powered-chatbot-technology/>
 6. "Y Combinator startups hop on the ChatGPT bandwagon, aiming to transform various industries." AppMaster. Accessed: Dec. 1, 2023. [Online]. Available: <https://appmaster.io/news/y-combinator-startups-chatgpt-inspired>
 7. J. Germain. "The future of AI in retail: Beyond the ChatGPT hype." TechNewsWorld. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.technewsworld.com/story/the-future-of-ai-in-retail-beyond-the-chatgpt-hype-177681.html>
 8. K. Wiggers. "Shopify Sidekick is like ChatGPT, but for e-commerce merchants." Medium. Accessed: Dec. 1, 2023. [Online]. Available: <https://techcrunch.com/2023/07/26/shopify-sidekick-is-like-chatgpt-but-for-ecommerce-merchants/>
 9. A. Palmer. "Amazon rolls out generative AI tool to help sellers write product listings." CNBC. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.cnbc.com/2023/09/13/amazon-rolls-out-generative-ai-tool-to-help-sellers-write-product-listings.html>
 10. M. Westmoreland. "Amazon launches generative AI to help sellers write product descriptions." Amazon. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.aboutamazon.com/news/small-business/amazon-sellers-generative-ai-tool>
 11. Z. Yushuo. "Alibaba's Taobao Tests ChatGPT-like Shopping Bot Taobao Wenwen." Yicai Global. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.yicai.com/news/alibabas-taobao-tests-chatgpt-like-shopping-assistant-taobao-wenwen>
 12. A. Chen. "Beyond the Buzz, Chinese e-commerce platforms use generative AI for boosting sales during 618 shopping festival." PingWest. Accessed: Dec. 1, 2023. [Online]. Available: <https://en.pingwest.com/a/11875>
 13. E. Schwartz. "Microsoft Bing augments online shopping with generative AI tools." Voicebot.ai. Accessed: Dec. 1, 2023. [Online]. Available: <https://voicebot.ai/2023/06/30/microsoft-bing-augments-online-shopping-with-generative-ai-tools/>
 14. K. Hines, "Amazon AI-generated customer review summaries: Pros and Cons," *Search Engine J.*, Aug. 16, 2023. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.searchenginejournal.com/how-ai-generated-customer-review-summaries-impact-amazon-sellers/494057/>
 15. S. M. Shugan, "The cost of thinking," *J. Consum. Res.*, vol. 7, no. 2, pp. 99–111, 1980, doi: 10.1086/208799.
 16. B. Allen. "AI in ecommerce: True one-on-one personalization is coming." CMSWire. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.cmswire.com/customer-experience/ai-in-ecommerce-true-one-on-one-personalization-is-coming/>
 17. Y. Jofie. "Lazada launches ChatGPT-powered chatbot." Tech in Asia. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.techinasia.com/lazada-launches-ecommerce-ai-chatbot-powered-chatgpt>
 18. D. Wightman-Stone. "Zalando to launch virtual fashion assistant powered by ChatGPT." FashionUnited. Accessed: Dec. 1, 2023. [Online]. Available: <https://fashionunited.uk/news/fashion/zalando-to-launch-virtual-fashion-assistant-powered-by-chatgpt/2023041969064>
 19. E. Schwartz. "Wayfair launches generative AI app for virtual interior decorating." Voicebot.ai. Accessed: Dec. 1, 2023. [Online]. Available: <https://voicebot.ai/2023/07/25/wayfair-launches-generative-ai-app-for-virtual-interior-decorating/>
 20. C. Vidhi. "Grocery retailers are among the first to embrace ChatGPT." Modern Retail. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.modernretail.co/technology/grocery-retailers-are-among-the-first-to-embrace-chatgpt/>
 21. S. Sularia. "Six ways retail can leverage generative AI to transform business." Forbes. Accessed: Dec. 1, 2023. [Online]. Available: <https://www.forbes.com/sites/forbestechcouncil/2023/03/14/six-ways-retail-can-leverage-generative-ai-to-transform-business/?sh=1e41fe9e4b7e>
 22. "The usage of ChatGPT in e-commerce." eClear. Accessed: Dec. 1, 2023. [Online]. Available: <https://eclear.com/article/the-usage-of-chatgpt-in-e-commerce/>
 23. S. S. Kim and J. Y. Son, "Out of dedication or constraint? A dual model of post-adoption phenomena and its empirical test in the context of online services," *MIS Quart.*, vol. 33, no. 1, pp. 49–70, Mar. 2009, doi: 10.5555/2017410.2017416.

NIR KSHETRI is a professor in the Bryan School of Business and Economics at the University of North Carolina at Greensboro, Greensboro, NC 27412 USA, and the "Computing's Economics" column editor for *Computer*. Contact him at nbkshetr@uncg.edu.