Artificial Intelligence in Product Development

By Nesha Zalesny

A Generational Approach

Artificial intelligence has become a near-daily fact of life for much of the world, but the way it is used and trusted varies widely across generations. Many Baby Boomers (those born between 1946 and 1964) take pride in being able to do calculations with a slide rule or in their heads, and in the kind of critical thinking that comes from doing the work manually. For them, AI often feels like a cheap shortcut at best and a threat at worst. Considering how often high-profile AI systems have been caught generating confident-sounding but false information, that skepticism is not only understandable but also rational.

Gen X (1965 to 1984) and younger generations tend to approach AI differently. Gen X grew up during the early days of personal computers; most did not have computers at home or in their classrooms, and the internet did not exist. However, they were likely introduced to word processing in high school or college and have spent most of their adult lives using computers. The Millennial generation likely had computers in their homes and even internet access growing up. Later generations have spent most of their lives with computers more powerful than early home computers in their pockets, along with unlimited internet access in the form of cell phones.

Most of us utilize our phones for nearly every aspect of our lives and AI apps are easily accessible. These apps are increasingly used for therapy prompts, travel planning, meal ideas, shopping lists, and a growing number of everyday decisions. Familiarity often translates into comfort. But comfort can also become complacency. One of the emerging risks with AI is not that it will fail dramatically and obviously. It's that it will fail quietly, in ways that look plausible enough to be accepted without scrutiny. This is where human knowledge and experience will be critical.

Agentic AI for Product Development

With AI dominating the broader media landscape, it was only a matter of time before the food industry started adopting it. The food industry is now seeing practical applications emerge in formulation and product development, customer management, and technical information sharing. But the real story is not "AI is coming." It's that AI is already here, and early adopters are beginning to discover what it can do.

At IFT First in Chicago in 2025, IMR had the opportunity to test CoDeveloper, IFT's branded agentic product development tool. CoDeveloper operates in two distinct modes. The first is a ChatGPT-style interface that draws on publicly available online sources. The second, called Sous (short for "sous-chef"), draws exclusively from academic publications and food science journals. To evaluate it, I asked both modes to generate a formulation for a vanilla ice cream mix, a product I know well.





The contrast was immediate and revealing. The internet-access mode produced what was, in my assessment, the more commercially viable formulation. The Sous mode generated something that may have aligned with published academic literature, but it stumbled on market practicality, especially around stabilizer use levels. This highlights a recurring reality: source material is critical. Academic research often focuses on single-variable studies and highly controlled conditions. That work is valuable, but it does not always translate cleanly into what manufacturers need: a formulation that performs under real processing conditions, real ingredient variability, and real cost constraints. Aside from the stabilizer issue, the rest of the Sous formulation was technically sound. But it took human experience to draw this conclusion. Overall, CoDeveloper

appears to offer value, particularly for organizations that don't have the time or budget to build custom AI tools from scratch. That said, the subscription price will determine how widely it is adopted by the food industry.

A second example comes from a small hydrocolloid supplier that built its own AI agent using Microsoft Copilot. Rather than developing a general-purpose "food formulation" tool, the company adopted a narrow, disciplined approach: they trained an AI agent exclusively on dairy science. They purchased and uploaded PDFs from universities and other institutions recognized for excellence in this area, including dairy and hydrocolloid texts that many industry experts have relied on for years.

Once trained, the company's AI agent was tasked with designing a structured customer questionnaire in Excel. Instead of relying on back-and-forth calls and scattered notes, the questionnaire captured the critical formulation parameters up front: solids, fat level, processing conditions, and ingredient restrictions. Once completed, the questionnaire served as direct input to the AI, which proposed a stabilizer blend tailored to the customer's specifications.

This approach led an ice cream manufacturer to adopt the proposed stabilizer system, and the supplier has since generated significant annual revenue from that single account. For a small firm without the budget for a dedicated R&D department, that is not just a productivity gain; it is a competitive advantage. The CEO described the technology as a way of "leveling the playing field" with larger competitors, and in this case, that description feels entirely accurate.

AI can provide a solid starting point for formulation work and help cut lead times, but human expertise is still essential. Only human experience can help refine the formulation, ensure process compatibility, validate performance, and, most importantly, refine product characteristics such as texture and flavor. That last point matters. AI can model structure, stability, and ingredient choices, but sensory development remains highly iterative and entirely human. Tools exist that could reduce the repetitive nature of sensory panels; electronic noses and tongues, and texture analyzers come immediately to mind. But these instruments need to be "taught" product parameters with human-validated data before they will be useful in an AI context. This work will take time and focused experimentation. For flavor, human instruments are the most important.

Curated Source Material is Invaluable

For the immediate future, companies could develop a customized Copilot or ChatGPT agent trained exclusively on their core categories, whether that's salad dressings, syrups, baked goods, or dairy. By training an agent with proprietary formulation data, trusted scientific references, and internal customer insights, these tools could generate base formulations, estimate nutritionals, and even propose cost-effective ingredients. Librarians could play a crucial role in curating materials for Agentic AI. When I first started my career, the company I was with had a full-time librarian with a Master's degree who oversaw a library with an extensive collection of scientific journals and lab notebooks. Having someone with this level of experience and knowledge to assist in curating material for AI would be extremely valuable. With a starting



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AI for Information Aggregation and Dissemination

One additional AI application that could be especially useful for the food industry is regulatory and safety intelligence. Few tasks are more time-consuming than reviewing decades of feeding trials, toxicology reports, and safety assessments, then turning those findings into usable information for product developers and regulatory teams. This is exactly the kind of high-volume, text-heavy work AI is well suited for.

A custom AI platform to conduct such an exercise is www.elicit.com, which is described by evaluators as follows:

Elicit is an advanced AI-driven tool designed to streamline literature reviews. Whether you're a seasoned academic or a novice researcher.

Elicit is an AI tool that is especially useful for researchers. Elicit combines multiple powerful features into a single platform. You can use it to easily search for and find relevant research papers, generate structured summaries of research papers in a table format, upload papers and instantly extract key data and insights from them, and many more.

IMR subscribes to the Elicit service and queried the platform on the safety evaluation of all hydrocolloids covered in The Quarterly Review of Food Hydrocolloids. The sample findings illustrate the clarity and utility of the summaries generated:

- Agar: "Overall, high-quality regulatory and experimental evidence substantiates agar's safe use as a food additive."
- Alginates: "The overall, methodologically robust conclusion is that sodium alginate is safe for its intended food applications."
- Carrageenan: "Food-grade carrageenan shows a strong safety profile with respect to general toxicity, carcinogenicity, and systemic exposure."

Reviewing and summarizing reams of feeding studies and safety data will not replace expert judgment, but it can dramatically shorten the path to insight, helping teams focus their time on what still requires human interpretation.



AI will not replace human expertise in the food industry. Instead, it will serve as a tool to streamline development, reduce costs, and expand access to basic formulation capabilities. AI cannot manage the complex interplay of flavors and textures in food, but it can provide a solid starting point. In our work, AI-assisted tools such as Grammarly for editing, Elicit for scientific paper summaries, and Claude for workflow management are essential. The detailed market intelligence gathered through personal interviews, site visits, and long-term relationships cannot be replaced with AI. However, AI enables us to spend less time on routine tasks and more on interpreting what the industry is telling us.

The integration of AI into the food industry is still in its early stages, but the momentum is real. If adopted thoughtfully, it could reshape competitive dynamics by giving both large and small players new ways to move faster, work smarter, and ultimately speed up innovation.

Nesha Zalesny is a Partner at IMR International, a market intelligence firm focused on food hydrocolloids. With more than 30 years of experience in the food industry, she provides technical and commercial insight on hydrocolloid applications, pricing, and global supply dynamics. She co-publishes The Quarterly Review of Food Hydrocolloids and Hydrocolleague Tidbits. fmt

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