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Synergizing Artificial Intelligence and Operations Research: Perspectives from INFORMS Fellows on the Next Frontier

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Abstract. In 1987, Herbert Simon envisioned a partnership between artificial intelligence (AI) and operations research and management science (OR/MS) to improve decision making. Nearly four decades later, as AI advances at a breakneck pace, Simon's vision remains relevant. This paper revisits Simon's perspective through a 2024 survey of Fellows of the Institute for Operations Research and the Management Sciences, capturing reflections from leading scholars and practitioners on how AI and OR/MS intersect today. The survey results highlight both opportunities and challenges. Many respondents see AI as a powerful tool that can complement OR/MS's structured approaches, such as in problem formulation and optimization. At the same time, they emphasize the importance of maintaining OR/MS's core strengths and identity, including its emphasis on mathematical rigor and interpretability. Although AI has opened new frontiers, its integration into OR/MS continues to evolve, shaped by shifts in research priorities, funding patterns, and educational needs. This article takes stock of where the collaboration between AI and OR/MS stands today and considers its future trajectory. The findings suggest that the two fields have much to gain from deeper engagement but that thoughtful alignment will be key. We hope that these insights contribute to an ongoing dialogue about how AI and OR/MS can inform and strengthen each other in the years ahead.

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Keywords: artificial intelligence • operations research and management science • interdisciplinary collaboration

1. Introduction

"The [management science and operations research] profession has, in a single generation, grown from birth to a lively adulthood and is playing an important role in the management of our private and public institutions. This success should raise our aspirations. We should aspire to increase the impact of [management science and operations research] by incorporating the [artificial intelligence] kit of tools that can be applied to ill-structured, knowledge-rich, nonquantitative decision domains that characterize the work of top management and that characterize the great policy decisions that face our society" (Simon 1987, p. 8). With these words, Herbert Simon opened his prescient 1987 article (Simon 1987) on the collaboration between artificial intelligence (AI) and operations research and management science (OR/MS).[1] Nearly four decades later, as we stand at the cusp of what Larry Summers calls a potential "dramatic discontinuity" in human history because of AI (Summers et al. 2024), Simon's vision for integrating AI and OR/MS deserves renewed attention. The parallels between then and now are striking.

Simon outlined this vision during AI's second winter, a period of reduced funding and tempered expectations on the impact of AI on society (Dai and Abràmoff 2023). Today, we find ourselves in quite the opposite situation—amid an AI boom spurred by massive data and technological breakthroughs, which has resulted in unprecedented investment and high optimism. Yet, Simon's core argument proves highly applicable even now; the future of OR/MS lies in synthesizing its structured model-driven optimization approaches with the flexible, data-driven AI methods.

This article revisits Simon's vision through the lens of contemporary developments in both fields and new insights from a 2024 survey of Fellows of the Institute for Operations Research and the Management Sciences (INFORMS). These fellows, representing leading voices in OR/MS, offer a unique perspective on the evolution,

current state, and future prospects of the collaboration between AI and OR/MS. Their responses reveal both encouraging signs of convergence and persistent challenges that must be addressed.

At its core, this article addresses three fundamental questions. First, how has the relationship between AI and OR/MS evolved since Simon's commentary, particularly in light of recent breakthroughs in generative AI? Second, what can we learn from INFORMS Fellows about the current state of integration between these fields? Finally, what steps should the OR/MS community take to realize Simon's vision of true crossfield collaboration in this new landscape?

Our analysis draws on a survey of INFORMS Fellows conducted between September and October 2024. The timing of this investigation is particularly fitting. As AI moves from specialized applications to general-purpose technology, the OR/MS community faces both opportunities and challenges. Survey responses indicate a complex landscape; whereas 75% of respondents believe that AI advances will drive future innovation in OR/MS methodologies, many express concerns about funding disparities and the potential overshadowing of core OR/MS contributions. This tension echoes Simon's observations about the delicate balance between mathematical rigor and heuristic flexibility in problem-solving approaches.

As we proceed, we will examine how Simon's original framework for the collaboration between AI and OR/MS can be adapted for the generative AI era characterized by foundation models that are influencing both research agendas and society at large. We consider both historical developments and current perspectives from the INFORMS community. The article concludes with recommendations for fostering meaningful integration between these fields, emphasizing Simon's enduring message that tools should serve problems rather than define them.

2. Overview of Survey

Our analysis is based on a survey administered to members of the INFORMS Fellows community between September and October 2024. The survey (see the appendix for survey questions), designed to capture expert perspectives on the evolving relationship between AI and OR/MS, received responses from 45 fellows, representing a 21.3% response rate from the 211 fellows included in the email distribution list.[2] Prior to the main survey period, which ran from September 19 to October 8, 2024, a pilot study was conducted between September 11 and 16, yielding an additional 12 responses that informed refinements to the final instrument.

The respondents reflected a substantial depth of experience in the field, with the overwhelming majority (41; 91.11%) reporting more than two decades of professional involvement.[3] Only two indicated between 10 and 20 years of experience, and two chose not to specify their tenure. Fifteen (34.88%) of respondents are retired. The survey also captured a broad cross-section of professional affiliations, with nearly 70% of respondents identifying as members of academic institutions and the remaining cohort engaged in industry or nonacademic roles. Although the majority of respondents hold primary academic appointments, several fellows from academia reported industry experience through prior work or consulting engagements.

The expertise of the respondents spans various topics, reflecting the broad purview of INFORMS members. Optimization, simulation, and applied probability were most frequently cited as methodological areas of focus. Highlighted application domains include healthcare, supply chain, retail, manufacturing, finance, and transportation. Among those who specified their affiliations, optimization emerged as a dominant subfield, with nine respondents citing membership in the Optimization Society, whereas five reported primary involvement in the Analytics Society.

The survey does not claim to be statistically representative of the entire INFORMS community, which consists of more than 12,000 members. Still, the survey responses offer a meaningful glimpse into how some of the field's most distinguished scholars and practitioners perceive the integration of AI into OR/MS. Their perspectives reflect both theoretical and applied considerations, highlighting opportunities and challenges associated with the increasing presence of AI. The insights drawn from this survey serve as a foundation for understanding the trajectory of collaboration between AI and OR/MS and the institutional and methodological shifts that may shape its future development.

3. Foundational Contributions of OR/MS and AI

The parallel evolution of OR/MS and AI is deeply intertwined with the development of modern computing, although each field emerged from distinct intellectual traditions and followed distinct trajectories. The story of their rise and eventual divergence can inform today's opportunities for reintegration.

OR/MS originated during World War II, where systematic analysis proved transformative in military operations. The field's early successes included optimizing convoy protection strategies that significantly reduced Allied shipping losses among others. These wartime contributions demonstrated the power of mathematical analysis to improve complex operational decisions, laying the groundwork for the field's civilian applications.

The roots of OR/MS reach well beyond optimization, including important advances in simulation, applied probability, and decision analysis. In 1947, George Dantzig developed the simplex method, a groundbreaking approach to linear programming (Dantzig 1990). Soon after, Richard Bellman's dynamic programming (Dreyfus 2002) and Ralph Gomory's integer programming (Jünger et al. 2009) methods further expanded the field. Around the same time, Stanislaw Ulam and John von Neumann introduced Monte Carlo simulations (Roger 1987), providing practical tools to tackle uncertainty and complexity. Queueing theory, advanced notably by Frank Kelly, David Kendall, and Leonard Kleinrock, became essential for analyzing telecommunications and operational systems (Kelly 1975, Kleinrock 1975). Decision analysis also emerged prominently through Howard Raiffa and Ronald Howard, who introduced decision trees and influence diagrams (Garber 2009), helping to systematically guide decisions under uncertainty. Although these early developments faced significant computational hurdles, the rapid growth in computing power during the 1950s and 1960s dramatically extended the applicability of OR/MS tools, making it possible to handle increasingly complex problems in practice.

AI emerged from a different intellectual tradition, although it shared OR/MS's connection to early computing. The field's symbolic birth occurred at the 1956 Dartmouth Summer Research Project on Artificial Intelligence, where leading figures, including John McCarthy, Marvin Minsky, Claude Shannon, and Herbert Simon, gathered to explore the possibility of machine intelligence (Moor 2006). The conference's ambitious agenda included natural language processing, neural networks, and automatic theorem proving—many of the same challenges that occupy AI researchers today.

Early AI successes demonstrated the field's distinct yet complementary approach compared with OR/MS. For instance, the Logic Theorist, developed by Allen Newell, Herbert Simon, and Cliff Shaw in 1956 (Newell and Simon 1956), employed heuristic search techniques to efficiently prove mathematical theorems, focusing on practical feasibility over exhaustive optimality. Although Warren McCulloch and Walter Pitts introduced artificial neural networks in the 1940s (McCulloch and Pitts 1943), the 1986 proposal of David Rumelhart, Geoffrey Hinton, and Ronald Williams of back propagation in neural network architectures enabled a new paradigm of adaptive learning and formed the foundation for future AI breakthroughs (Rumelhart et al. 1986). Unlike OR/MS's traditionally structured optimization methods, AI's adaptive and flexible approach enabled exploration of more complex, less structured problem spaces. This facilitated advances in diverse areas, such as natural language processing, computer vision, and robotics, highlighting AI's capability to deliver practical, effective solutions to problems less amenable to precise mathematical formulation.

Both OR/MS and AI have been influenced by the rise of data and computing capabilities, which continue to progress at tremendous speeds. Throughout these transformative years, the distinctions between OR/MS's structured mathematical models and AI's heuristic flexibility have persisted in many cases. Simon recognized that this difference was not a weakness but reflected complementary approaches to problem-solving. Although OR/MS excels at well-defined problems amenable to mathematical formulation, the field's enduring strength has been its problem-driven, impact-oriented perspective that prioritizes practical applications over theoretical elegance alone. This emphasis aligns well with AI's development of tools for tackling ill-structured, knowledge-rich domains that defied precise mathematical representation. There are thus natural opportunities for collaboration between these groups, although these opportunities have not been fully realized.

4. Divergence and Complementarity

The historical divergence between OR/MS and AI was shaped by their differing research priorities. Our survey of INFORMS Fellows reveals the persistence of this historical split while also highlighting emerging areas of convergence. Fellows generally view OR/MS and AI as adjacent disciplines (27 respondents; 69.2%); nine (23.1%) view AI as a subset of OR/MS, and three (7.7%) consider OR/MS a subset of AI. The complementarity between structured optimization and heuristic flexibility is widely recognized among today's OR/MS professionals. As one fellow noted, "Since the definition of AI is fluid, let's just say I consider myself an expert in adjacent areas. I am a knowledgeable and well informed neighbor of AI!" This perspective was echoed by another respondent who described themselves as "an informed user, and someone looking to have my work benefit from the advances in AI, and contribute to those advances as well."

Twenty-four respondents (60.0%) report that AI is extensively or moderately integrated into their work, with similar proportions in both academic (18 of 30; 60.0%) and industry (6 of 9; 66.7%) settings. Much of this integration is through AI as an additional technical tool, but one of many: "AI is a tool … AI is a very nice hammer and not all problems are nails." For others, AI is more fundamental: "It will guide optimization modeling and algorithms as well as being guided by them." These views suggest substantial progress toward Simon's vision of collaboration, although the journey is far from complete. Simon's recommendation is as important now as it was

nearly four decades ago (Simon 1987, p. 11): "Instead of differentiating between [operations research] and AI, we need to confuse, blend, and synthesize them as much as possible. We need to build our professional institutions and organizations to use them together, supporting, reinforcing, and extending each other."

The survey reveals strong recognition of synergies between OR/MS and AI both in theory and in application. These opportunities are increasing: "With growing capabilities, I see a growing sophistication in approaches to integrate AI and other data-centric methods with [operations research] and other decision-centric approaches." An overwhelming majority of respondents (36; 87.8%) agree that OR/MS methodologies are fundamental to enhancing AI algorithms. Similarly, 31 respondents (73.8%) believe that OR/MS is key to translating data and AI insights into end-to-end decision making. As one respondent noted: "Many AI implementations tend to include [operations research] techniques and ideas integrated with what is commonly viewed as the purview of [computer science] expertise. It is important to ensure that [operations research] is recognized as critical for the success of AI implementations. Both communities need to see the need for interdisciplinary collaboration that exploits the skills and expertise from both CS and [operations research]."

Along with "OR/MS for AI," the reciprocal value of "AI for OR/MS" is also acknowledged. Thirty respondents (71.4%) expect AI advancements to drive future innovation in OR/MS methodologies, which is already being seen in areas ranging from combinatorial optimization heuristics (Bengio et al. 2020) to large language model (LLM)-enabled model formulation (Wasserkrug et al. 2024). In addition, 32 respondents (76.2%) anticipate AI's significant impact on OR/MS applications. Indeed, AI has reached even some of the most classical operations research application areas, such as manufacturing (Senoner et al. 2022) and revenue management (Miklós-Thal and Tucker 2019).

5. Revisiting Simon's Key Themes

In his 1987 article, Simon (1987) identified fundamental complementarities between AI and OR/MS. Despite widespread skepticism about AI's practical value at the time, Simon recognized the fields' mutual value. His insights transcend the cyclical nature of AI interest and are worth revisiting in today's era of (perhaps excessive) AI optimism.

Simon's analysis centered on three key observations about the nature of managerial decision making and problem-solving. First, he recognized that most managerial decisions involve natural language and unstructured information rather than purely numerical data. This insight seems almost obvious today as LLMs process and generate human-like text, but it represented a significant departure from the quantitative focus that dominated OR/MS in the 1980s.

Modern developments attest to the value of unstructured information; whereas the "big data revolution" was largely built on structured data, the increasing ability to leverage multimodal data has transformed model-based prediction and discovery. This is true across industries. Healthcare systems can learn from their patients' clinical notes and images to predict their trajectories (Soenksen et al. 2022). Retailers can learn from their customers' feedback on social media to forecast sales (Cui et al. 2018). Financial services organizations can learn from earnings calls and media coverage to anticipate market trends (Papasotiriou et al. 2024). Fellows recognize the value of AI in this context when leveraged in concert with OR/MS.

Second, Simon recognized expert systems as a bridge between AI's knowledge-processing capabilities and OR/MS's decision optimization techniques. The discussion of expert systems proves interesting in light of current developments. Today's LLMs and decision support systems realize aspects of this vision, although perhaps not in the rule-based manner that Simon envisioned. Even with these emergent capabilities, there is a growing appreciation of the need for AI systems to incorporate human expertise. In high-stakes applications, AI is increasingly viewed as a decision *support* tool rather than an automation tool (De Cremer and Kasparov 2021). This perspective informs model development and evaluation strategies. The OR/MS community is well positioned to contribute to the human-AI intersection given its historic emphasis on downstream decisions rather than pure quantitative performance. Simon argued that the real challenge in OR/MS often lies not in optimizing a well-defined problem but in structuring the problem itself. One survey respondent highlighted this connection, foreseeing that "[t]here will be more integrated solutions using AI/[operations research] and humans together solving hard problems."

Third, Simon argued that the distinction between optimization and heuristic methods reflected differences in problem characteristics rather than fundamental superiority of either approach. He viewed AI's "hunting license"—its flexibility in tackling ill-structured problems—as complementary to OR/MS's rigorous optimization methods. This perspective resonates with current INFORMS Fellows, such as a respondent who anticipates "better integration of optimization and AI, helping each other" and another who sees an opportunity to "expand [the] scale, scope, and complexity of problems that we can solve."

Although highlighting the respective strengths of both fields, Simon also warned about the risks of excessive specialization, arguing that separation between AI and OR/MS could impede progress in both fields. This concern remains relevant today as indicated by survey responses about institutional structures and funding patterns. However, the nature of the challenge has evolved. Where Simon worried about insufficient computational resources forcing specialization, he predicted that advances in computer memory and processing power would eventually remove the technical barriers between AI and OR/MS applications. This has largely come true as cloud computing and specialized AI hardware have made computational resources abundant. However, integration is not seamless. Methodological and institutional gaps remain, and AI's momentum brings a new risk of drawing talent and attention away from fundamental OR/MS contributions.

6. The Case for Renewed AI-Operations Research Integration

The technological landscape has evolved dramatically since Simon's writing, making his vision of collaboration more achievable than ever. Yet, our survey reveals that technical feasibility alone does not guarantee successful integration. The current AI boom has created a complex landscape of opportunities and challenges that requires careful navigation. We highlight three domains that reflect this tension and offer corresponding recommendations: funding structures; differences in academic and industry perspectives, particularly in relation to education and training; and institutional mechanisms, such as professional societies, conferences, and journals.

6.1. Funding

The funding environment illustrates the complex impact of AI on OR/MS.[4] Among our respondents, 12 (35.3%) report increased difficulty in securing funding, whereas 7 (20.6%) have found it easier, and 15 (44.1%) remain neutral. These numbers, however, tell only part of the story. The responses reveal a shift toward AI in research framing. Ten respondents (23.2%) report having submitted funding proposals specifically related to AI, with nine (20.9%) of these coming from academia. Some describe incorporating AI components into traditional OR/MS proposals, whereas others have made a larger shift; responses ranged from "strategy includes AI applications as motivation" to "I became an AI researcher." Several respondents noted the challenge of maintaining OR/MS's identity in pursuit of funding. One fellow observed that funding "depends how the work is packaged. Industry is presently more open to funding projects that have AI (may be due to the hype)."

The National Science Foundation remains the leading funder of AI-operations research work, named by eight respondents (18.6%) as their primary source. Industry funding (six respondents, 14.0%) and Department of Defense grants (five respondents, 11.6%) follow closely. The growing investment of the private sector in AI research has expanded the pool of potential funding sources; this diversification is particularly relevant in light of the funding environment in 2025 (Bhatia et al. 2025, Palmer 2025, Primack 2025). Going forward, the OR/MS community should diversify its funding sources—leveraging increased industry interest while sharpening the justification for federal investment in OR/MS initiatives—to ensure sustained support for innovation.

6.2. Education

Academic and industry respondents had notable differences in their view of AI on the field. Among academic respondents, 15 of 26 (57.6%) view AI's role as positive compared with 8 of 9 (88.9%) nonacademic respondents. The challenge of recruiting students presents a particular concern, with 18 respondents (43.9%) reporting greater difficulty in light of AI. As one academic stated, "I believe it is important for us to play an active role to ensure our contributions to the advancement of AI is recognized and valued by the AI community; this will be important for the continued success of our field, including being able to attract students and researchers in [operations research]." Student interest in AI can be leveraged for OR/MS education if positioned appropriately; failure to do so threatens to create a generational gap in OR/MS expertise precisely when integration between fields is most critical.

To this end, in recent years, many operations research degree and certification programs, in engineering and business schools alike, have been added or revamped to emphasize training in applying AI and relatedly, the fluency in handling data and computational implementation to enhance the industrial scope and attractiveness of operations research professionals. These changes have ranged from the introduction of general data and machine learning courses to domain-specialized "analytics" courses in financial technology, healthcare systems, service platforms, etc., where the need of reliable data-to-decision pipelines naturally gives rise to opportunities in AI-operations research integration. Although this evolution arguably has been more detectable at the undergraduate and master's levels, doctoral programs and certainly, the research focus of operations research as a field have recognized a significant uptick of data/AI-driven methods in works on both methodological theory and empirical applications.

In fact, our industry respondents often describe AI as a tool for extending OR/MS's reach into new domains. One industry fellow noted that "AI is another set of tools in our optimization tool box, sometimes standing on its own, sometimes in combination with other tools in the tool box." Interestingly, this remark echoes Simon's concern from 1987: "After about 1960, AI and [operations research] went their separate ways; whole new generations of scientists trained in each of these disciplines were largely unacquainted with the techniques provided by the other" (Simon 1987, p. 10). Although we are seeing more research that bridges these disciplines today, Simon's remark points to the importance of potentially larger and structural developments of new education programs, especially at the doctoral level, at the intersection of AI and OR/MS, including dedicated coursework and mentoring initiatives, so that the next generation of researchers and practitioners is fluent in both domains. INFORMS programs, such as the Artificial Intelligence School for Computer Science and Operations Research Education Summer School (AI-SCORE 2024), provide a meaningful start.

6.3. Institutional Mechanisms

Structures to support the integration of AI and OR/MS are still developing. Although many respondents support the creation of new journals (28 respondents; 63.6%) and dedicated conferences (23 respondents; 53.5%), there is a strong emphasis on initially leveraging existing academic venues. Respondents suggest starting to foster interdisciplinary dialogue with targeted sessions, workshops, and tutorials through established organizations—such as INFORMS, the Association for the Advancement of Artificial Intelligence (AAAI), and the Association for Computing Machinery (ACM). There are several successful examples of this approach to date. A joint workshop series on AI and operations research for decision making hosted by INFORMS, ACM's Special Interest Group on Artificial Intelligence (SIGAI), and the Computing Community Consortium brought together over 60 researchers from 2021 to 2024 to identify common challenges and opportunities for collaboration (Kulkarni et al. 2025a). A list of key recommendations resulting from the series reinforces Simon's core ideas (Kulkarni et al. 2025b). INFORMS and AAAI also introduced a bridge program in the 2025 AAAI conference titled "Combining AI and OR/MS for Better Trustworthy Decision Making" (Association for the Advancement of Artificial Intelligence 2025a). This approach aligns closely with Simon's original recommendation: "The guiding principle is: mix them up! Meetings, and especially sessions, that bring AI and [operations research] into the same room can provide a model for the future." This strategy may help build stronger connections between the AI and OR/MS communities before potentially establishing entirely new journals or conferences.

We note that although the OR/MS community is increasingly engaging with AI, the AI community also stands to benefit from further integration with OR/MS. Many high-impact AI applications, from supply chain management to transportation and humanitarian logistics, are built on problems that are fundamentally operations research in nature. AI enhances prediction and representation, but operations research provides the structure, constraints, and rigor needed for real-world decision making. From decision-focused learning to industry applications, such as NVIDIA's AI optimization work (NVIDIA 2025), it is clear that AI systems rely on operations research to move from insights to actions. The OR/MS community has a key role to play in making this case—through research (INFORMS 2025) and tutorials (Boussioux et al. 2024) that highlight operations research as a core engine behind intelligent decisions. Indeed, there is greater recognition within AI communities of the importance of collaboration with OR/MS communities. Beyond the ACM SIGAI example, a partnership between AAAI and INFORMS (Association for the Advancement of Artificial Intelligence 2025b) aims to drive forward the frontiers of decision making through the combination of AI and OR/MS skills. Such collaborations help members of the respective organizations identify and apply the right combination of methods to address shared goals.

Despite challenges, most respondents remain optimistic about integration prospects. Only five respondents (11.4%) view AI as a threat to their subdiscipline, with similar proportions in both academic (10%) and industry (15.4%) settings. One fellow summarized: "As the field matures, my expectation is that the technical community will evolve to leverage both [AI and operations research] in concert for greater impact." This optimism, however, comes with clear awareness of the work required.

7. AI and Society

Given the intertwined roots and trajectories of the AI and OR/MS communities, INFORMS Fellows offer uniquely valuable perspectives on AI's broader societal implications. Their views, shaped by decades of working at the intersection of quantitative methods and real-world problems, suggest both opportunities and challenges that may not be apparent in mainstream AI discussions.

Most respondents (30; 69.8%) believe that AI's benefits outweigh its risks. However, their optimism comes with important caveats. An overwhelming majority (38; 88.4%) calls for stricter ethical guidelines. As one fellow

noted, "While I believe we have no choice, AI is coming and will be having impacts on our lives. I am worried that we do not have enough guardrails in place to ensure that negative outcomes do not arise. It is critical to dedicate resources to creating and enforcing guardrails." Such concerns are warranted in the presence of algorithmic bias (Samorani et al. 2022), LLM-generated misinformation (Barman et al. 2024), and other issues combined with uncertain accountability structures (Novelli et al. 2024). This is an opportunity for the OR/MS community, with its emphasis on downstream decision making and managing multiple objectives. Such considerations are highly relevant when balancing the benefits and risks of AI deployment.

The impact of generative AI on academia emerged as a particularly rich theme, which affects not just OR/MS but the broader scientific community. Fellows described fundamental changes in how research is conducted, ranging from literature review to result writing. One respondent provided a comprehensive vision echoed by several others: "LLMs, properly used, can potentially facilitate the research workflow (human supervision is essential), ranging from help in literature reviews, coding, and writing up results (the latter especially for nonnative English speakers)."

Education is facing a similar transformation; respondents emphasized the need to teach students not just how to use AI tools but how to think critically about their application. As one fellow explained, "students will be able to use AI for assignments. It will be important to teach students how to use AI programs responsibly: how to get the most out of any AI program and how to question the output intelligently." As with other industries, there is a risk that AI leads to the devaluing of technical expertise: "Organizations might decide that a person without high level training and experience will believe they can implement [operations research] tools without the deep knowledge and expertise." The impact of AI on work is seen more broadly across society, with 26 respondents (60.5%) anticipating widespread job automation. Although there is clear acknowledgement of AI risks, the minority of respondents (eight; 18.6%) noted AI as a significant extinction risk.

Fellows' comments about AI's impact on practical problem-solving reveal both excitement and caution. Although many see opportunities for faster solution development and broader application of OR/MS techniques, they also emphasize the importance of maintaining rigorous analytical standards. One respondent captured this duality: "I see the use of generative AI will grow dramatically. We need to prepare [operations research] professionals on how to do this that leverages the main benefit (speed) and does not put such projects at risk by not having experienced [operations research] professional[s] fully engaged." Another fellow noted the parallels to search engine adoption: "The community at large should learn how to use AI, as we've learned how to use search engines." Like Google and related search engines, generative AI introduces a new fundamental tool integrated into research and practice, yet discretion and expert judgment remain necessary for their appropriate use.

Some fellows express skepticism about current AI enthusiasm, with one respondent succinctly stating: "Lot of hoopla!" This perspective, although in a minority, reflects OR/MS's traditional emphasis on demonstrable results over theoretical possibilities. Several respondents emphasized the importance of distinguishing between genuine advances and marketing hype, especially in evaluating AI's potential impact on different application domains. Ultimately, much remains yet to be seen: "[AI] will have strongly positive impacts and strongly negative impacts. It's hard to know what will be more important."

8. Conclusions

Herbert Simon concluded his article by positioning OR/MS as part of the "Second Industrial Revolution," an era focused on understanding and enhancing intelligence. As we navigate what might be considered the Third Industrial Revolution—or perhaps, a genuine technological discontinuity—his vision of the collaboration between AI and OR/MS has renewed relevance.

Our survey of INFORMS Fellows reveals a community that largely shares Simon's vision of integration for two fields whose historical divergence may have been more institutional than intellectual. Today's OR/MS professionals see clear complementarity between the structured optimization approaches of OR/MS and the flexible, heuristic AI methods. This recognition manifests not just in theoretical appreciation but in practical integration, with most respondents reporting significant AI components in their work.

Yet, fulfilling Simon's vision demands more than simply integrating OR/MS with AI or vice versa. The divergence between academic and practitioner views on AI highlights the need to close the theory-practice gap. At the same time, funding shifts and recruitment challenges press OR/MS to maintain its identity while adapting. We identify several recommendations: foster collaboration through professional societies via joint conferences, journals, and initiatives, promote crosstraining in AI and OR/MS through education, and expand support for interdisciplinary research. Some steps lie within the community's control; others depend on institutional and policy change. AI and OR/MS are structurally complementary, and our systems should reflect that.

We note several limitations. By focusing on INFORMS Fellows, our sample reflects perspectives of long-tenured members, not those of early- and midcareer professionals who will shape the next phase of AI integration. Engaging this rising cohort is a key priority for future work. We also acknowledge the volatility of technological progress and societal adaptation—exemplified by the swift emergence of LLMs since late 2010s. The survey thus captures a moment in time. Yet, as Simon's decades-old vision for AI and operations research still resonates amid today's shifts, we believe that the survey's core insights will remain relevant as the field continues to evolve.

Simon's closing words resonate strongly today (Simon 1987, p. 15): "Management science and operations research are a part of the great effort, often styled the Second Industrial Revolution, that is striving to understand and enhance intelligence. Joining hands with AI, management science and operations research can aspire to tackle every kind of problem-solving and decision-making task the human mind confronts." Today, as AI increasingly reaches nearly every domain of society, this aspiration becomes both more achievable and more urgent.

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Appendix. INFORMS 2024 Fellows AI Survey Questions

1. *Do you consider yourself an AI expert?* Yes, no, or other (please specify).
2. *Is your work related to AI?* Yes, no, or other (please specify).
3. *Please briefly describe your AI-related work. This will help us create a bank of applications for future seminars and speaker lists.* Open-ended response.
4. *How is AI integrated into your professional subfield?* Extensively integrated, moderately integrated, slightly integrated, not integrated, or other (please specify).
5. *Do you think AI poses a threat to your subfield?* Yes, no, or other (please specify).
6. *In what ways do you see AI impacting your professional subfield in the next 5–10 years?* Open-ended response.
7. *In 10 years, what do you see as AI's role at the INFORMS annual meeting?* Central theme with multiple sessions, one of several key themes, a minor theme, not present, and other (please specify).
8. *Should INFORMS introduce an AI-focused conference?* Yes, and I would actively participate (e.g., attend, present, or organize); yes, but I would not personally participate in the conference; or no, I don't believe an AI-focused conference is necessary.
9. *Should INFORMS introduce an AI-focused journal?* Yes, and I would read the journal, consider submitting manuscripts, and potentially serve as an editor or reviewer; yes, and I would read the journal, but I am unlikely to submit manuscripts or serve as an editor or reviewer; yes, but I would not personally be interested in reading or contributing to the journal; or no, I don't believe an AI-focused journal is necessary.
10. *How much value do you see in AI for the INFORMS community's work?* Very high value, high value, moderate value, low value, or very low value.
11. *Where do you think the INFORMS community can add the most value in the development and deployment of AI?* Research and development, practical deployment, policy and guidelines, or education and training.
12. *How do you perceive the relationship between operations research/management science (OR/MS) and AI?* OR/MS is a subset of AI, AI is a subset of OR/MS, or OR/MS and AI are adjacent disciplines.
13. *How much harder or easier is it to attract students to OR/MS in light of the AI boom?* Significantly harder, somewhat harder, neutral, somewhat easier, or significantly easier.
14. *To what extent do you agree with the following statements?* Strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree, or no opinion.
    - OR/MS methodologies are fundamental to enhance AI algorithms.
    - OR/MS is key to translating data/AI into end-to-end decision making.
    - AI advancements will drive future innovation in OR/MS methodologies.
    - AI advancements will drive future innovation in OR/MS applications.
15. *Have you submitted funding proposals related to AI?* Yes, no, or other (please specify).
16. *If your response to question 15 is yes, please describe these funding opportunities and any challenges you have faced.* Open-ended response.

17. *What directorates or funding bodies have you found most supportive of AI-influenced OR/MS proposals?* National Science Foundation (NSF), National Institutes of Health (NIH), Department of Defense (DoD), private foundations, industry funding, or other (please specify).
18. *If your response to question 17 is NSF, please specify the program (e.g., operations engineering (OE), computer and information science and engineering (CISE), or other).* Open-ended response.
19. *Has the AI boom made it more difficult or easier to get funding for OR/MS work?* Significantly more difficult, slightly more difficult, neutral, slightly easier, or significantly easier.
20. *How has the rise of AI funding opportunities affected your funding strategy or research agenda?* Open-ended response.
21. *How do you perceive AI's role in broader society?* Extremely positive, positive, neutral, negative, extremely negative, or other (please specify).
22. *To what extent do you agree with the following statements?* Strongly agree, somewhat agree, neutral, somewhat disagree, strongly disagree, or no opinion.
    - AI poses a significant risk to human extinction.
    - AI will lead to widespread job automation.
    - The benefits of AI outweigh the risks.
    - AI advancements need stricter ethical guidelines.
23. *Which INFORMS subdivisions are you most heavily involved with?* Open-ended response.
24. *How many years have you been a member of INFORMS?* Open-ended response.
25. *Are you currently employed?* Yes, full time; yes, part time; retired; or unemployed.
26. *What is or was your primary professional affiliation?* Academia, industry, government, nonprofit, or other (please specify).

Endnotes

[1] Today, the term OR/MS is more commonly used than management science and operations research. Thus, we adopt OR/MS throughout the remainder of this article.

[2] There are 360 living fellows as of December 2024, of which 211 have provided contact information.

[3] Not all participants answered all questions, so the respondent count varies by question. Percentages are reported using the number of respondents.

[4] We note that this survey was conducted in October 2024, and the funding environment has changed significantly in the subsequent months. We thus interpret the fellows' responses with caution.

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