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Artificial Intelligence, Information Asymmetry, and Strategic Competition: Game-Theory Based Perspectives

Dr. Hetal B. Chokshi

Faculty, Economics, Huston City College, Huston, Texas, United States

Abstract

Technology has revolutionized the ways of doing businesses. The advent of artificial intelligence (AI) is changing strategic decision making through its impact on the acquisition, processing, and utilization of information. This paper aims to explore the interplay of artificial intelligence, information asymmetry, and strategic competition through the lens of game theory. It discusses how AI-powered predictive analytics, automation of decisions, and advanced data processing may help diminish information disparity, yet at the same time, give rise to the formation of new competitive advantages for organizations having superior technological means. By appealing to the ideas of signaling games, Bayesian games, and strategic interaction, the research sheds light on how the uneven distribution of AI and information may affect the competitive behavior, pricing strategies, market entry, negotiations, and resource allocation of the players. The study additionally addresses how artificial intelligence may change the beliefs, available strategies, and payoffs of the players under conditions of asymmetric information.

Keywords: *Artificial Intelligence, Information Asymmetry, Game Theory, Strategic Competition, Decision-Making, Bayesian Games, Competitive Strategy, Predictive Analytics*

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1. Introduction

The emergence of artificial intelligence (AI) has become one of the technologies influencing greatly the way in which companies gather information, predict outcomes, and make strategic decisions. The progress in machine learning, prediction, and generative AI allows the organizations to use big amounts of both structured and unstructured data and include them in the strategic decision-making process. The AI technology becomes especially important for companies operating in the environment with uncertainty because prediction becomes one of the inputs in management decisions. The progress in AI predictions can affect the way of how the decision-making authority is divided between people and machines and influence how the organizations behave in case of uncertain market conditions (Agrawal et al., 2019). Information asymmetry is one of the concepts that are especially useful in studying the strategic role of AI. It means that there exists information inequality between economic actors related to transactions and competition situations. AI can eliminate some of the informational inequalities as it helps the company better recognize patterns, assess different options, and create strategic insights based on the available data (Csaszar et al., 2024). Recent research shows that AI technologies can help the organization in developing strategic decisions and their assessment. However, such capabilities may also generate new informational inequalities because firms differ substantially in their access to high-quality data, computing infrastructure, technological expertise, and sophisticated AI models.

Game theory provides an appropriate analytical framework for examining these changing competitive relationships because strategic outcomes depend not only on the decisions of an individual firm but also on the anticipated actions and information possessed by competitors. In markets characterized by incomplete information, firms may remain uncertain about competitors' resources, preferences, strategies, costs, or expected payoffs. Bayesian game theory formally incorporates such uncertainty by

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allowing players to form beliefs about unknown characteristics and select strategies on the basis of available information. Harsanyi's framework for games with incomplete information therefore provides an important theoretical foundation for examining how AI-generated information may modify beliefs, strategies, expected payoffs, and equilibrium outcomes in competitive environments (Harsanyi, 1967). The relationship among AI, information asymmetry, and strategic competition has become increasingly relevant as access to data and advanced AI capabilities becomes an important source of competitive differentiation. AI-related market power can depend on the availability and mobility of training data and input data, together with complementary factors such as computing resources, platform structures, model openness, and access to users (Gans, 2026). These conditions suggest that AI may simultaneously enhance informational efficiency and create strategic advantages for firms controlling critical technological resources. Examining these dynamics through a game-theoretic perspective can therefore clarify how differences in AI capabilities affect competitive behaviour, strategic interaction, and market outcomes under asymmetric information.

2. Background of Study

The rapid development of artificial intelligence has fundamentally changed the informational environment within which firms compete and formulate strategies. Traditionally, competitive decisions have been constrained by limited information, uncertainty regarding competitors' actions, and differences in managerial capacity to interpret market signals. AI-based systems have expanded firms' capabilities to analyse large datasets, identify patterns, forecast demand, and support complex decisions. From an economic perspective, AI can be understood as a general-purpose technology capable of influencing productivity, organizational processes, and the structure of economic activity. However, the strategic benefits generated by AI are unlikely to be distributed uniformly because organizations differ in technological capabilities, data resources, skills, and complementary investments (Brynjolfsson et al., 2019). Information asymmetry provides an important theoretical foundation for examining these differences. Information asymmetry exists when one participant in an economic interaction possesses information that is unavailable or imperfectly observable to another participant. Such informational differences can influence transactions, strategic behaviour, bargaining, market signalling, and competitive outcomes. The foundational work of Akerlof (1970) demonstrated that unequal information between market participants can substantially affect market quality and efficiency. Within AI-driven competitive environments, the problem acquires an additional dimension: firms possessing superior datasets, algorithms, computational resources, or analytical capabilities may generate information that competitors cannot easily observe or replicate. AI can potentially reduce uncertainty within an organization while simultaneously increasing informational differences between competing organizations.

These conditions make game theory particularly relevant for analysing AI-driven strategic competition. Strategic interaction occurs when the outcome obtained by one market participant depends partly on the decisions and anticipated responses of other participants. Game-theoretic models provide systematic mechanisms for analysing such interdependent decisions, particularly where players possess different information, incentives, and strategic alternatives. The development of information economics further demonstrates that informational differences can affect incentives, organizational arrangements, and market outcomes rather than merely representing imperfections in communication (Stiglitz, 2002). The examining AI, information asymmetry, and strategic competition within an integrated game-theoretic framework can provide deeper insight into how AI capabilities affect information advantages, strategic choices, competitive responses, and equilibrium outcomes in contemporary markets.

3. Scope and Significance of Study

The scope of the present study encompasses the interrelationship among artificial intelligence, information asymmetry, and strategic competition from a game-theoretic perspective. It focuses on

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how AI-supported information processing and analytical capabilities can influence strategic decision-making when competing actors possess unequal or incomplete information. The study considers AI as a strategic resource capable of supporting information acquisition, interpretation, forecasting, and evaluation of alternatives. Information has long been recognized as an essential component of rational strategic decision-making, particularly where managers must evaluate alternatives under uncertain conditions (Citroen, 2011). The study is significant because AI is increasingly moving beyond routine automation toward supporting complex organizational and strategic decisions. In competitive environments, organizations may differ considerably in their access to data, analytical technologies, computational capabilities, and AI expertise. Such differences can affect the information available to decision-makers and consequently influence strategic choices and competitive interactions. Research indicates that the integration of AI into organizational decision-making presents opportunities for managing uncertainty while also raising important questions concerning the division of decision-making tasks between humans and intelligent systems (Trunk et al., 2020). A game-theoretic approach is useful for examining how players respond strategically when information and AI capabilities are unevenly distributed.

The study also has theoretical and managerial significance. Theoretically, it connects AI-enabled decision-making with information asymmetry and strategic interaction, thereby providing a framework for understanding how technological capabilities may modify competitive behaviour. Managerially, understanding these relationships can assist organizations in recognizing how AI adoption, data analytics, and human–AI capabilities contribute to competitive differentiation (Gaikwad, 2024). Evidence suggests that AI can change traditional sources of competitive advantage by creating new capabilities at the intersection of human expertise and machine intelligence (Krakowski et al., 2022). The study can contribute to strategic management literature while offering insights for managers seeking to use AI effectively without overlooking information inequalities and competitive responses.

4. Objective of Study

- To examine the role of Artificial Intelligence (AI) in strategic decision-making under conditions of uncertainty and incomplete information
- To analyze the influence of AI capabilities on information asymmetry among competing firms and market participants
- To investigate how information asymmetry affects strategic choices and competitive behaviour among economic actors
- To examine the interaction between AI-enabled information advantages and strategic competition using a game-theoretic perspective
- To explore the application of game-theoretic concepts, particularly signaling and Bayesian games, in explaining AI-driven strategic interactions
- To identify the strategic and managerial implications of AI-driven information advantages for organizations operating in competitive environments

5. Review of Literature

According to Neshenko & Ryall (2026), artificial intelligence has increasingly been examined as a strategic organizational capability rather than merely an automation technology. AI enables organizations to process complex datasets, identify patterns, generate predictions, and support decisions in uncertain competitive environments. The examined the relationship between artificial intelligence and organizational decision-making and proposed the concept of human–AI symbiosis. The study emphasized that AI possesses considerable advantages in computational analysis, particularly when decisions involve complexity and large quantities of information, whereas human decision-makers retain important capabilities relating to intuition and handling ambiguity. These capabilities become important because firms possessing superior AI systems may obtain information and insights more rapidly than competitors. The differences in AI adoption may affect the quality and timing of strategic decisions. Some studies indicate that AI should be considered not only as an

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operational tool but also as an information-processing capability capable of reshaping strategic interaction among competing organizations (Jarrahi, 2018).

Information asymmetry constitutes another important theoretical dimension of strategic competition. It occurs when participants involved in an economic interaction do not possess equivalent information regarding relevant conditions, resources, intentions, or expected outcomes (Bergh et al., 2019). The systematically reviewed the application of information asymmetry theory in management research and demonstrated its relevance across areas such as corporate governance, strategic management, entrepreneurship, and organizational relationships. Their analysis indicates that information asymmetry affects the behaviour of organizational actors because parties possessing superior information may gain advantages in decision-making and negotiation. Within AI-intensive markets, this issue becomes particularly significant because organizations differ in their access to proprietary datasets, algorithms, analytical expertise, and computational resources. AI may decrease internal uncertainty by improving information processing while simultaneously producing or reinforcing informational advantages between competitors (McCannon, 2025). Thus, integrating information asymmetry theory with AI research provides an appropriate foundation for investigating why technological differences can generate different strategic positions and competitive responses.

The strategic value generated through AI also depends on the manner in which organizations combine technological resources with complementary organizational capabilities. Artificial intelligence capability as an organizational-level capacity developed through the combination and deployment of AI-specific resources. Their empirical research demonstrated that AI capability can contribute to organizational creativity and performance, highlighting the importance of technological, human, and organizational resources in realizing value from AI. This perspective has substantial relevance to strategic competition because firms are unlikely to possess identical AI capabilities. Organizations with superior data resources, technological infrastructure, managerial knowledge, and skilled personnel may develop stronger predictive and analytical capacities than their competitors. Such capability differences can influence the information available to firms when choosing competitive strategies. AI capability can therefore become a source of strategic heterogeneity, affecting how organizations evaluate competitors, anticipate market developments, allocate resources, and respond to uncertainty. These observations provide a basis for examining AI-generated informational advantages within competitive strategic interactions (Mikalef & Gupta, 2021).

Game theory offers an important conceptual mechanism for integrating these technological and informational dimensions because it examines decisions in situations where the outcomes of one actor depend upon the choices of others. Strategic competition increasingly occurs in environments where firms observe competitors imperfectly and must form expectations regarding their capabilities and future behaviour (Bimpikis et al. (2019). The demonstrated usefulness of game-theoretic analysis in examining competition where firms possess strategic incentives and market outcomes depend on network structure and interactions among competing actors. Although their analysis concerns competition in networks rather than AI specifically, the underlying framework illustrates how differences in strategic position and available information can affect firms' actions and equilibrium outcomes. In AI-enabled markets, similar reasoning can be extended to situations in which players possess different technological capabilities or private information. Bayesian and signalling games are particularly relevant because they allow strategic behaviour to be examined under incomplete information. The game theory provides a systematic foundation for analysing how AI-generated information advantages may affect beliefs, strategic responses, competitive behaviour, and eventual market outcomes.

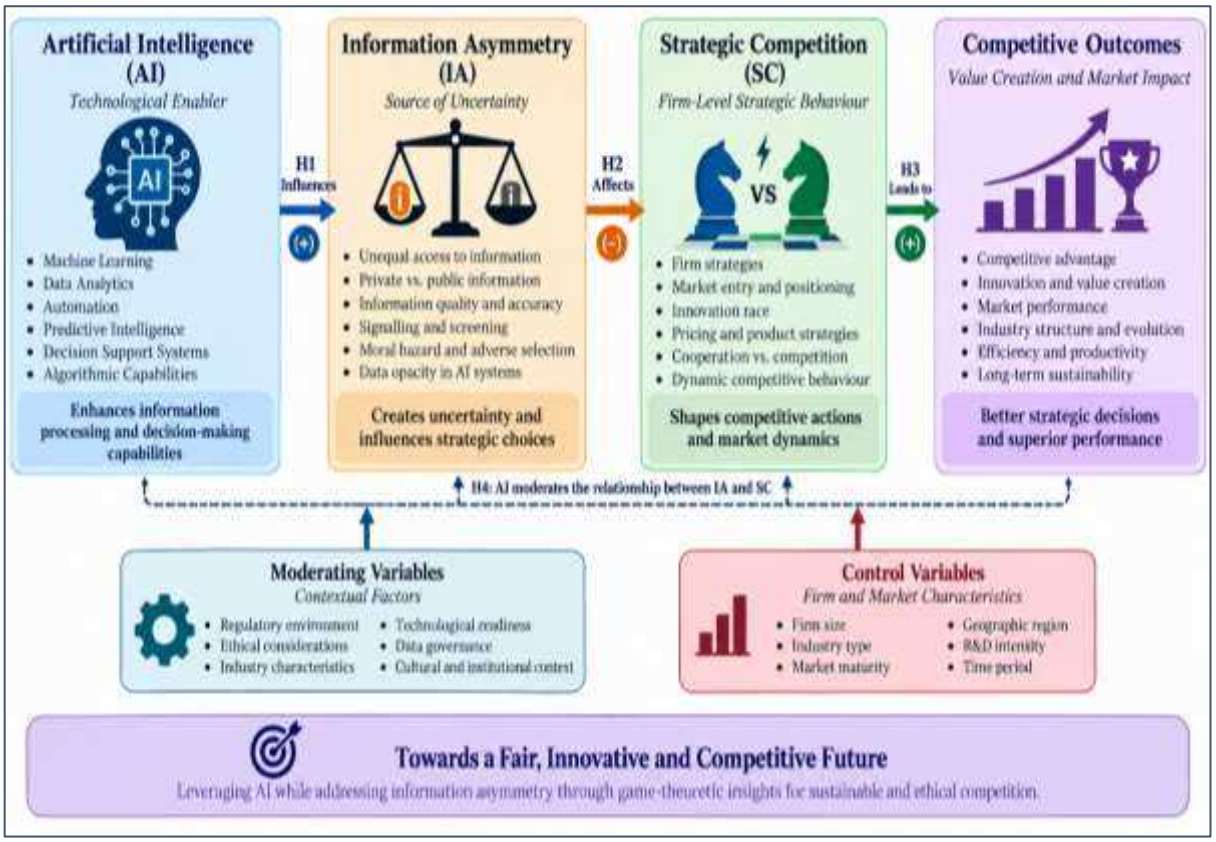
6. Discussion and Analysis

The interaction between artificial intelligence and strategic decision-making indicates that AI is changing the informational foundations on which firms compete. AI enables organizations to analyse

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large datasets, recognize complex patterns, predict market developments, and evaluate strategic alternatives more rapidly. However, the strategic value of AI does not arise solely from possessing sophisticated algorithms; it also depends on access to relevant data, complementary organizational resources, managerial capabilities, and the capacity to translate predictions into decisions (Shrestha et al. (2019). AI has important implications for organizational decision structures because decisions can be delegated to algorithms, retained by humans, or organized through hybrid arrangements. From a competitive perspective, these differences can produce heterogeneous decision-making capabilities among firms. Organizations capable of integrating AI effectively into strategic processes may therefore obtain informational advantages by recognizing opportunities or threats earlier than competitors. AI consequently changes not only decision efficiency but also the distribution of strategic information among market participants (Choi et al., 2025). The relationship between AI and information asymmetry is nevertheless complex because AI can simultaneously reduce and intensify informational inequalities. Advanced analytical systems can reduce uncertainty by converting large amounts of data into actionable information, thereby allowing organizations to make better-informed decisions. At the same time, firms do not possess equal access to high-quality datasets, computing infrastructure, technological expertise, or financial resources required for sophisticated AI deployment. This can create an "AI divide" in which technologically advanced organizations possess information and predictive capabilities that are difficult for less technologically equipped competitors to reproduce.

Figure 1: Conceptual Framework of Interlinking AI, IA, SC & CO through Game Theory



The conceptual framework is the way by which Artificial Intelligence (AI) impacts strategic competition through alteration of information. AI techniques such as machine learning, predictive analytics, automation, and decision support systems can either lessen or re-shape the information asymmetry, and hence impact the strategy options of firms with regard to price, innovation, market entry, positioning, and collaboration. From game theory perspective, the firm operates as a strategic player whose decisions are based on information available, competitors' reactions expected, incentives, and expected payoffs. The information asymmetry and strategic competition interaction may even vary

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under different circumstances, including regulations, ethics, technology, and institutions, whereas firm and market features are control variables. The economic implications are particularly important because data and algorithms can generate feedback mechanisms through which successful firms improve their services, attract additional users, collect further data, and strengthen their competitive position (Crémer et al. (2019). The strategic importance of data in digital markets and demonstrate that data access can influence competition and market structure. Information asymmetry in AI-enabled markets should therefore be understood as a dynamic competitive condition rather than merely a temporary information deficiency.

A game-theoretic interpretation provides further insight into how firms may respond to these informational differences. In strategic games, organizations make decisions by considering not only their own information and expected payoffs but also the likely strategies and responses of competing players. AI can influence this process by improving prediction regarding competitor behaviour, customer responses, pricing patterns, market entry, and other strategically relevant variables. At the same time, competitors may deliberately conceal private information or strategically reveal selected information through signals. This makes Bayesian and signalling approaches particularly relevant to AI-intensive competition, where firms frequently operate without complete knowledge of competitors' technological capabilities or intentions (Calvano et al. (2020). For example, demonstrate that autonomous pricing algorithms can learn strategies that generate coordinated market outcomes even without explicit communication. Their findings illustrate the broader strategic significance of algorithmic interaction: when multiple AI-enabled decision-makers respond repeatedly to one another, competitive outcomes may emerge from algorithmic learning itself rather than solely from conventional managerial decisions.

The study indicates that AI, information asymmetry, and strategic competition form an interconnected system. AI can enhance informational efficiency at the firm level while creating new strategic inequalities at the market level. The competitive outcome depends upon how firms acquire data, develop AI capabilities, interpret information, anticipate rivals, and modify strategies in response to changing conditions. This development also has implications for managers and policymakers because increasing reliance on algorithmic decision-making can affect competition, accountability, transparency, and market governance (Kellogg et al. (2020). The demonstrate that algorithms can reshape organizational control by changing how information is generated, evaluated, and used to direct decisions and behaviour. Accordingly, a game-theoretic perspective helps explain AI-driven competition as an evolving strategic interaction in which information, technological capabilities, beliefs about competitors, and expected payoffs jointly determine organizational choices and competitive outcomes.

7. Finding of Study

- Artificial intelligence strengthens the ability of organizations to process complex information, predict market developments, evaluate strategic alternatives, and respond more rapidly to competitive changes.
- AI-supported analytics can reduce information gaps by improving access to, processing of, and interpretation of market and organizational data. This enables decision-makers to operate with greater informational clarity under uncertain conditions.
- The benefits of AI are not equally distributed. Firms with superior data, computational resources, skilled professionals, financial capacity, and advanced algorithms can develop informational advantages over less technologically capable competitors.
- The organizations possessing superior information can better anticipate market trends, customer behaviour, competitors' responses, and potential risks. Information therefore functions as an important strategic resource in AI-driven competitive environments.
- The study finds that game-theoretic concepts are useful for explaining strategic interactions among AI-enabled competitors. In particular, Bayesian games can represent competition under

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incomplete information, while signaling games can explain how firms reveal or conceal strategically relevant information.

- AI-generated predictions can alter the information available to players and consequently influence their beliefs, strategic choices, responses to competitors, and expected outcomes within competitive games.
- When multiple organizations employ AI-driven systems, strategic competition may increasingly involve interaction between algorithms as well as between human decision-makers. Such interactions can influence pricing, market positioning, resource allocation, and competitive responses.
- AI can provide analytical speed and predictive capabilities, but strategic interpretation, contextual judgement, ethical considerations, and accountability continue to require meaningful human involvement.

8. Conclusion

Artificial intelligence is making a significant impact on the informational and competitive environment of modern organizations. The technology allows for analyzing large amounts of information, finding patterns, predicting market changes, and making strategic decisions much faster and more precisely. Artificial intelligence has stopped being just a technical tool; it has become a strategic asset affecting organizations' perception of markets, opportunity assessment, risk prediction, and reactions to competitors. Additionally, the analysis shows that there is a rather complicated connection between artificial intelligence and information asymmetry. AI reduces uncertainty through providing access to and analyzing strategically important information. Nevertheless, all organizations are not equally equipped with high-quality information, advanced algorithms, computational power, money, and skilled specialists in AI. Game theory perspective shows how such distinctions impact beliefs, strategies, and possible payoffs of the players, as well as expected responses. The importance of Bayesian and signalling games lies in the possibility to analyze competitive behaviour when firms use incomplete and asymmetrically distributed information. According to the study, the strategic advantages of using artificial intelligence depend on the ability to combine technology, information, managerial decisions and good governance. Companies should manage to combine AI prediction and human understanding, ethics, accountability and data governance. Game theory perspective clearly shows that the value of any AI-based strategy cannot be estimated in isolation from the actions of competitors.

References

- Agrawal, A., Gans, J. S., & Goldfarb, A. (2019). Artificial intelligence: The ambiguous labor market impact of automating prediction. *Journal of Economic Perspectives, 33*(2), 31–50. https://doi.org/10.1257/jep.33.2.31
- Akerlof, G. A. (1970). The market for “lemons”: Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics, 84*(3), 488–500. https://doi.org/10.2307/1879431
- Bergh, D. D., Ketchen, D. J., Jr., Orlandi, I., Heugens, P. P. M. A. R., & Boyd, B. K. (2019). Information asymmetry in management research: Past accomplishments and future opportunities. *Journal of Management, 45*(1), 122–158. https://doi.org/10.1177/0149206318798026
- Bimpikis, K., Ehsani, S., & Ilkılıç, R. (2019). Cournot competition in networked markets. *Management Science, 65*(6), 2467–2481. https://doi.org/10.1287/mnsc.2018.2995
- Brynjolfsson, E., Rock, D., & Syverson, C. (2019). Artificial intelligence and the modern productivity paradox: A clash of expectations and statistics. In A. Agrawal, J. Gans, & A. Goldfarb (Eds.), *The economics of artificial intelligence: An agenda* (pp. 23–57). University of Chicago Press. https://doi.org/10.7208/chicago/9780226613475.003.0001

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- Calvano, E., Calzolari, G., Denicolò, V., & Pastorello, S. (2020). Artificial intelligence, algorithmic pricing, and collusion. *American Economic Review, 110*(10), 3267–3297. https://doi.org/10.1257/aer.20190623
- Choi, S., Kang, H., Kim, N., & Kim, J. (2025). How does artificial intelligence improve human decision-making? Evidence from the AI-powered Go program. *Strategic Management Journal, 46*(6), 1523–1554. https://doi.org/10.1002/smj.3694
- Citroen, C. L. (2011). The role of information in strategic decision-making. *International Journal of Information Management, 31*(6), 493–501. https://doi.org/10.1016/j.ijinfomgt.2011.02.005
- Crémer, J., de Montjoye, Y.-A., & Schweitzer, H. (2019). *Competition policy for the digital era*. European Commission.
- Csaszar, F. A., Ketkar, H., & Kim, H. (2024). Artificial intelligence and strategic decision-making: Evidence from entrepreneurs and investors. *Strategy Science*. https://doi.org/10.1287/stsc.2024.0190
- Gaikwad, S. R. (2024). Role of artificial intelligence in smart manufacturing of automobile industry in India. *AIP Conference Proceedings, 3178*(1), 070012. https://doi.org/10.1063/5.0229368
- Gans, J. S. (2026). Market power in artificial intelligence. *Annual Review of Economics, 18*, 417–445. https://doi.org/10.1146/annurev-economics-051624-061832
- Harsanyi, J. C. (1967). Games with incomplete information played by "Bayesian" players, I–III: Part I. The basic model. *Management Science, 14*(3), 159–182. https://doi.org/10.1287/mnsc.14.3.159
- Jarrahi, M. H. (2018). Artificial intelligence and the future of work: Human-AI symbiosis in organizational decision making. *Business Horizons, 61*(4), 577–586. https://doi.org/10.1016/j.bushor.2018.03.007
- Kellogg, K. C., Valentine, M. A., & Christin, A. (2020). Algorithms at work: The new contested terrain of control. *Academy of Management Annals, 14*(1), 366–410. https://doi.org/10.5465/annals.2018.0174
- Krakowski, S., Luger, J., & Raisch, S. (2022). Artificial intelligence and the changing sources of competitive advantage. *Strategic Management Journal, 44*(6), 1425–1452. https://doi.org/10.1002/smj.3387
- McCannon, B. C. (2025). Artificial intelligence and strategic uncertainty: Can AI play mixed strategies? *The Journal of Risk and Uncertainty, 71*(2). https://doi.org/10.1007/s11166-025-09467-5
- Mikalef, P., & Gupta, M. (2021). Artificial intelligence capability: Conceptualization, measurement calibration, and empirical study on its impact on organizational creativity and firm performance. *Information & Management, 58*(3), 103434. https://doi.org/10.1016/j.im.2021.103434
- Neshenko, N., & Ryall, M. D. (2026). When artificial intelligence does strategy: Learning, good times, lock-in, and human-driven strategic renewal. *Strategy Science*. https://doi.org/10.1287/stsc.2025.0448
- Shrestha, Y. R., Ben-Menahem, S. M., & von Krogh, G. (2019). Organizational decision-making structures in the age of artificial intelligence. *California Management Review, 61*(4), 66–83. https://doi.org/10.1177/0008125619862257
- Stiglitz, J. E. (2002). Information and the change in the paradigm in economics. *American Economic Review, 92*(3), 460–501. https://doi.org/10.1257/00028280260136363
- Trunk, A., Birkel, H., & Hartmann, E. (2020). On the current state of combining human and artificial intelligence for strategic organizational decision making. *Business Research, 13*, 875–919. https://doi.org/10.1007/s40685-020-00133-x

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