

THE HONG KONG POLYTECHNIC UNIVERSITY DEPARTMENT OF MANAGEMENT AND MARKETING

Departmental Research Seminar

The Philosopher's Stone for Science – The Catalytic Role of AI in Scientific Creativity By



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Date : 22 Jul 2026 (Wed)
Time : 10:30 am – 12 noon
Venue : GH120c, PolyU

Abstract

This study examines whether and under what conditions artificial intelligence (AI), including machine learning and algorithms, is associated with scientific creativity. Drawing on the Logical Creative Thinking (LCT) framework, we conceptualize creativity as a structured search process governed by two mechanisms: recombination, reflected in novelty, and replacement, reflected in disruption. Using publication and citation-network data from more than 21 million papers published between 2000 and 2019, we identify AI-in-use research based on abstract/title keywords and compare AI-in-use and non-AI papers using established measures of novelty and disruption. We find that, on average, AI-in-use papers are associated with higher levels of both novelty and disruption. However, these relationships vary across levels of creativity. For novelty, AI-in-use is positively associated with both mid-tier and top-tier novel work, with stronger gains in mid-tier research. For disruption, AI-in-use is primarily positively associated with top-tier disruptive work, suggesting that AI may reinforce conventional trajectories in mid-tier research while enabling paradigm-shifting contributions when deployed by visionary researchers. We further find substantial heterogeneity across fields: the association between AI-in-use and both novelty and disruption is stronger in analytically oriented fields, such as Basic and Applied Science, and weaker—and at times negative—in more interpretive domains, such as Social Science and the Humanities. Finally, different AI tool categories exhibit distinct patterns: machine perception and data retrieval tools are more strongly associated with novelty, whereas pattern recognition and predictive modeling tools are more strongly associated with disruption. Together, these findings advance understanding of AI's role in scientific knowledge production by showing how AI can support both exploratory recombination and transformative change, with substantial variation across contexts.

Prof. Yi-Jen (Ian) Ho is a professor at the Harbert College of Business, Auburn University. He is interested in understanding the impacts of emerging information technologies. His current research focuses on location-based services and artificial intelligence. He applies various methods to obtain insights and identify causalities, including game-theoretic modeling, econometrics, randomized experiments, and machine learning. His research has appeared in premier business journals, including *Information Systems Research* and *Production and Operations Management*. He received the *Gordon B. Davis Young Scholar Award* in 2022 and the *Nunamaker-Chen Dissertation Award* in 2017 from the INFORMS Information Systems Society. His research won several best paper awards and runner-up at major conferences, including INFORMS *Information Systems* and *eBusiness* Sections, *PACIS*, and *WeB*. He is serving as an associate editor for *Management Information Systems Quarterly* and served as a guest senior editor at *Production and Operations Management*. He also served as a cluster co-chair, associate editor, and program committee member for conferences.

All interested are welcome.



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