Li & Fung Supply Chain Institute Research Grants 2025

12 projects have been awarded with research grants. Summaries of the projects are as follows:

1. Establishing Digital Product Passport for Sustainable Supply Chains: Centralized and Decentralized Approaches to Data Governance

Prof. Masaru YARIME, Associate Professor of Division of Public Policy, HKUST

This project examines the emergence of Digital Product Passports (DPPs) as a key innovation bridging sustainability goals and digital transformation in the global economy. Driven by environmental challenges and the shift towards a circular economy, DPPs aim to provide transparent, dynamic records of a product's lifecycle, offering insights into materials, environmental impacts, and circularity potential for stakeholders, including consumers, businesses, and regulators. The European Union is at the forefront of this movement, mandating DPPs for various products to foster a more sustainable and circular economy. Implementing DPPs presents significant challenges, particularly in establishing clear and trusted data governance frameworks. Key issues include defining data ownership, access rights, responsibility for accuracy and security, liability, and dispute resolution mechanisms. The complexity is amplified by the need to share potentially sensitive information among multiple actors in complex value chains, raising concerns about trust, confidentiality, and data misuse. This project explores different governance models, including centralized and decentralized approaches, analyzing their advantages and disadvantages. The battery sector, with its complex global supply chains and the impending EU Battery Passport mandate, serves as a key case study to examine these challenges in practice. Interviews with key stakeholders involved in battery supply chains will be conducted to obtain detailed information. The insights gained from the battery sector are expected to inform the development and implementation of DPPs in other industries and provide valuable implications for public policy and governance.

2. Robust AI-Driven Forecasting and Inventory Optimization for E-Commerce Inventory Operations

Prof. Yi CHEN, Assistant Professor of Department of Industrial Engineering and Decision Analytics, HKUST

As e-commerce continues to grow rapidly, managing inventory efficiently under uncertain and dynamic conditions has become increasingly important. This project aims to develop data-driven tools that help ecommerce platforms make better forecasting and inventory decisions. We focus on two key challenges: accurately predicting product demand and optimizing inventory across multiple levels of a supply chain, such as warehouses and delivery centers. To improve demand forecasting—especially for new or low-sales

products—we propose a method that transfers knowledge from related products to improve accuracy, while accounting for uncertainty and changes in customer behavior. For inventory management, we design decision models that coordinate stock levels across different fulfillment stages to accommodate fluctuating demand and supply conditions. Our approach combines tools from machine learning and operations research, with emphasis on robustness—ensuring decisions remain effective even when data are noisy or unpredictable. The expected outcomes include reducing stockouts, lowering excess inventory, and improving customer satisfaction. The project ultimately aims to provide practical, scalable decision-support tools that can help businesses operate more efficiently in fast-paced, competitive e-commerce environments.

3. **Trade Uncertainties, Supply Chain Restructuring and Sourcing Strategy: Evidence from Chinese Firms**

Prof. Yao Amber LI, Associate Professor of Department of Economics, HKUST

Our study delves into the effects of global trade uncertainties (e.g., tariff escalation and retaliation highlighted in recent trade war) on the restructuring of firms' supply chain networks, with a focus on their sourcing strategies. The Greater Bay Area (GBA), a crucial node in the global value chain, serves as the central focus of our investigation. By integrating trade data with comprehensive firm-to-firm shipment records, we aim to construct a detailed map of firms' supplier networks and analyze how they adapt to adverse trade shocks by modifying their sourcing strategies. We will evaluate the influence of trade shocks, such as tariff increases, on the decisions firms make regarding their sourcing origins. Moreover, we will compare the responses of firms within the GBA to those located outside the region for their sourcing origin decisions and their supply chain network adjustments.

4. **Adoption and Impact of AI Technologies on Firm Supply Chain Networks: Enhancing Resilience and Operational Efficiency**

Prof. Miaozhe HAN, Assistant Professor of Department of Information Systems, Business Statistics and Operations Management, HKUST

Global supply chains are increasingly susceptible to disruptions from natural disasters, geopolitical tensions, and pandemics, underscoring the necessity for resilient and adaptable supply chain management practices. The rapid advancements in AI technologies, particularly machine learning and data analytics, offer unprecedented opportunities for reshaping supply chain operations, enhancing operational efficiency and resilience.

Despite existing literature often focusing on technical specifics or isolated case studies, there exists a substantial gap in comprehensive studies that scrutinize both adoption behaviors and their broader implications across diverse industries. Moreover, the integration of AI into supply chain operations, such as demand forecasting, inventory management, and logistics, along with the specific effects of AI technology on supply chain networks, remains largely

unexplored. Through an empirical study (with causal identification) based on the Lightcast Job Posting Data, the S&P Compustat Database, and the FactSet Revere Supply Chain Relationships Data, this proposal aims to enhance the insights into how firms adopt AI in their supply chain operations and the impacts of AI on supply chain performance.

5. GenAI-Powered Market News Summarization for Supply Chain Risk Monitoring

Prof. Yi YANG, Associate Professor of Department of Information Systems, Business Statistics and Operations Management, HKUST

In an era of escalating geopolitical tensions, global trade disruptions, and climate-related uncertainties, timely and accurate supply chain risk intelligence is essential for safeguarding the economic resilience of highly open and trade-dependent economies like Hong Kong. As a leading financial centre and logistics hub, Hong Kong faces disproportionate exposure to cross-border supply chain disruptions. However, critical risk signals are often embedded in vast volumes of fragmented and unstructured text, ranging from banking reports and corporate disclosures to market news and policy announcements, making manual monitoring and analysis approaches slow, labor-intensive, and limited in scope. This project proposes the development of a GenAI-powered Supply Chain Risk Intelligence System tailored to the policy needs of Hong Kong. Leveraging recent breakthroughs in generative artificial intelligence (GenAI), the system will automatically extract, summarize, and reason over heterogeneous textual data to generate risk insights across three levels: firm, sector, and region, which enables policymakers to align strategic responses with micro-level operational concerns and macro-level systemic threats. Methodologically, the project introduces three innovations: (1) a unified risk information extraction pipeline for multi-source data; (2) a hierarchical risk summarization framework guided by expert knowledge; and (3) a generative reasoning module using chain-of-thought prompting to uncover hidden risks. The project delivers a deployable prototype system, a policy brief for government stakeholders, and high-impact academic outputs. Ultimately, it aims to strengthen Hong Kong's position as a resilient, risk-informed regional hub in an increasingly volatile global landscape.

6. Developing a Corporate Credit Risk Index for Hong Kong Firms Using Supply Chain Data and Machine Learning

Prof. Yi YANG, Associate Professor of Department of Information Systems, Business Statistics and Operations Management, HKUST

Amid escalating geopolitical tensions and global trade disputes, businesses around the world are confronting unprecedented uncertainty. These challenges are particularly acute for Hong Kong—a highly open, trade-dependent economy and financial hub—where external shocks such as trade war and supply chain disruptions have significantly increased systemic financial risk. However, current credit risk practices either rely on professional rating agencies, which

are costly, updated infrequently, and often inaccessible to small- and medium-sized enterprises, or focus solely on internal firm-level financial indicators, overlooking the complex structures and dynamic changes of inter-firm dependencies within supply chains. To provide a real-time and comprehensive credit risk assessment, this project proposes a machine learning framework for corporate credit risk prediction driven by supply chain networks. The framework integrates three innovative methodologies to investigate the impact of supply chain networks on credit risk: (1) a machine learning model that captures multi-hop supplier-customer relationships; (2) a temporal modeling method that tracks the evolution of supply chain structures over time; and (3) an automated neural network architecture that jointly learns high-order and temporal patterns in supply chain. By pioneering complex supply chain network modeling and advanced machine learning techniques, this project significantly improves credit risk prediction in interconnected business environments. Focusing on Hong Kong, we aim to build an automated platform that delivers real-time and broadly-scoped credit risk index to policymakers, financial institutions, and businesses, empowering them to make informed decisions and enhance resilience amid global uncertainty.

7. **Environmental regulation, local operations, and home country effect: Understanding multinationals' carbon reduction from an attention-based approach**

Prof. Jiatao LI, Chair Professor of Department of Management, HKUST

This project adopts the attention-based view to investigate how multinational enterprises (MNEs) engage in carbon reduction across their global operations. We argue that MNEs adopt varying decarbonization strategies depending on the degree of organizational attention allocated to climate change mitigation in each host location. Specifically, we focus on the influence of three key factors: environmental regulation, the scale of local operations, and whether the country in question is the firm's home country. We hypothesize that MNEs are more likely to reduce emissions in countries with stricter environmental regulations, larger local operational footprints, and in their home countries. Furthermore, this project will examine whether firm-level decarbonization initiatives—such as setting science-based targets, linking executive incentives to carbon performance, and implementing green transformation projects—can enhance overall organizational attention to climate issues. We expect that these measures may attenuate the influence of the aforementioned contextual factors and foster greater consistency in MNE behavior across countries. To test our hypotheses, we plan to leverage a proprietary dataset from the Carbon Disclosure Project (CDP), which provides granular, country-level emissions data for MNEs. This dataset enables us to examine how the three focal factors differentially affect Scope 1 and Scope 2 emissions. The anticipated findings aim to shed light on how MNEs operationalize decarbonization globally, offering both theoretical insights and practical implications for enhancing ESG management in supply chains and advancing sustainable development across global value chains.

8. Platform Manipulation in Competitive Crowdfunding

Prof. Lijian LU, Assistant Professor of Department of Information Systems, Business Statistics and Operations Management, HKUST

Online crowdfunding platforms have emerged as a vital tool for entrepreneurs and individual creators to raise funds from a distributed audience. However, the openness of these platforms also makes them susceptible to manipulation that can distort backer perceptions on project's attractiveness and success rate, leading to misguided investment decisions and eroding trust in the crowdfunding ecosystem. This proposed project aims to develop a game-theoretical model to examine the incentives of a crowdfunding platform to manipulate creators' project attractiveness (e.g., through fraudulent review, fake backers, inflated funding goals, misleading project descriptions, or dishonest endorsement and algorithmic gaming). The creators decides crowdfunding prices and, after successful crowdfunding campaigns, also regular prices to continue selling their funded products on the platform (e.g., through the support of InDemand program on Indiegogo). Our objective is to explore the incentives of the platform for manipulating the attractiveness of crowdfunding projects, and investigate the roles of pricing commitment (by studying dynamic pricing and static pricing) on the incentives of important stakeholders in this crowdfunding marketplace.

9. Supply Chain Finance: Sharing Contracts via A New Return Function

Prof. Shaohui ZHENG, Chair Professor of Department of Information Systems, Business Statistics and Operations Management, HKUST

In this study, we will develop a new concept, the "return function" R, as an alternative to the classical objective function (net profit) H of the newsvendor (NV) model. As random variables, $E(R) = E(H)$; hence, R can also be viewed as net profit. Moreover, we can show that R dominates H in concave order; namely $Ef(R) \geqslant Ef(H)$ for any concave function f. Based on the return function R, we will propose a "sharing contract," between a producer and an investor, as an alternative to the traditional loan contract. The sharing contract will be analyzed in detail for various objective functions, including the traditional NV objective (linear) and the risk measure CVaR etc. In each case, the optimal production quantity will be derived, and the proper range for γ will be specified. In all cases, we will identify conditions under which R will dominate H, in terms of increased benefits for both the producer and the investor. In addition to deriving the optimal production decision in all cases, we will also derive a real-time hedging strategy for the investor to mitigate the risk and compensate for profit loss in low-demand scenarios.

10. Trade War 'Winners' Revisited: Environmental Consequences of Manufacturing Relocation

Prof. Deyu RAO, Assistant Professor of Department of Economics, HKUST

The US-China trade war has reshaped global production networks, with some countries experiencing economic gains from redirected manufacturing activity. While these relocations may boost employment and growth, their environmental consequences remain poorly understood. This study investigates whether nations benefiting from trade diversion face unintended environmental costs due to expanded manufacturing scales, even as they reap economic rewards.

We propose an integrated framework combining international trade theory and environmental economics to analyze how multinational firm relocations—particularly to Southeast Asian countries like Vietnam and Malaysia—affect emissions through three key channels: (1) sectoral composition shifts, (2) production scale effects, and (3) technology transfer through firm-level abatement investments. Our methodology develops a quantitative model incorporating sector-specific energy intensities and productivity-dependent abatement technologies, building on recent advances in trade and environmental economics literature.

This research makes two primary contributions: First, it provides systematic evidence on whether trade warinduced production shifts exacerbate pollution in host countries. Second, it examines the conditions under which multinational firms' technology advantages might mitigate environmental damage. The analysis will distinguish between local pollutants (e.g., SO_2) and global emissions (e.g., CO_2), as their policy implications differ substantially.

By quantifying these complex interactions, the study aims to inform debates on sustainable trade policy. Potential findings could help policymakers design targeted interventions—such as green FDI incentives or carbon-adjusted tariffs—to align economic diversification with environmental objectives. The project underscores the need to evaluate trade conflicts through both economic and ecological lenses.

11. AI-Based Robust Inventory Control with Demand Uncertainty

Prof. Nian SI, Assistant Professor of Department of Industrial Engineering and Decision Analytics, HKUST

The rapid advancement of artificial intelligence (AI) technology has revolutionized numerous industries, with supply chain management being one of the most significantly impacted areas. At the heart of supply chain management lies the critical challenge of inventory control, which directly influences operational efficiency, cost optimization, and customer satisfaction. Traditional approaches to inventory control often rely on the assumption that demand is either known or stationary. However, in real-world scenarios, these assumptions frequently fail to hold true due to the dynamic and unpredictable nature of market conditions, consumer behavior, and external disruptions. This proposal aims to address the complexities of inventory control under uncertain demand, a problem that has become increasingly relevant in today’s volatile business environment. We aim to develop innovative solutions that enhance the robustness and adaptability of inventory management systems.

12. Bottom-Up Dragons: How China's Borderland SOEs are Reshaping the Go Global Strategy in Southeast Asia

Prof. Naubahar SHARI, Head and Professor of Division of Public Policy, HKUST

This research will examine how China's borderland state-owned enterprises (SOEs) are reshaping the implementation of the “Go Global Strategy” through a bottom-up approach, focusing on Yunnan province's SOEs and their infrastructure and energy investments in Southeast Asia. While existing literature predominantly analyzes China's outward foreign direct investment through the lens of centrally-owned SOEs, this study will investigate how local SOEs from border regions have become key players in developing signature infrastructure projects in neighboring countries. Using a mixed-method approach combining quantitative analysis of investment data (2000-2023) and qualitative interviews with key stakeholders, the research will examine how Yunnan's SOEs have leveraged their geographical proximity, cultural ties, and local government connections to successfully compete with and sometimes outperform central SOEs in Southeast Asian markets. The study will analyze three major Yunnan SOEs – Yunnan Construction Investment Holding, Yunnan Energy Investment Group, and Yunnan Water – to understand their investment strategies, adaptation mechanisms, and relationships with host countries. This research challenges conventional understanding that central government-owned SOEs should always dominate overseas investments due to their financial and political advantages. It will demonstrate how China's "Go Global Strategy" has evolved to incorporate diverse implementing agents, suggesting a more nuanced model of Chinese state capitalism where local state actors play pivotal roles in advancing China's economic influence abroad.