

1 September 2026 Tuesday, 13:00 – 15:00

Session 1: Advanced Analytics & AI Decision Systems

Location: Lecture Theatre 2

Chaired by Yuhan Guo

1. From Data to Decisions with Attention: A Record-Feature Transformer for the Newsvendor Problem (13:00-13:25)

Maryam Motamedi, Mohammad Moshtagh

Data-rich retail environments increasingly require replenishment decisions that are not only predictive, but also directly optimized for operating costs. In the classical newsvendor problem, underage and overage costs imply that the decision maker should not forecast the conditional mean of demand, but instead learn a cost-sensitive conditional decision rule. Most existing data-driven newsvendor models map each observation independently from a fixed vector of covariates to an order quantity, thereby underusing two important structures in modern operational data: interactions among features within a record and similarity among historical records. We propose a record-feature attention newsvendor model that learns both structures jointly. Feature attention identifies which covariates and feature interactions are relevant for each decision, while record attention lets a target observation attend to historically similar demand contexts. The model is trained under the integrated newsvendor loss, rather than a forecasting loss, and is evaluated against linear quantile regression, gradient-boosting quantile regression, random forest, and Multilayer Perceptron (MLP) benchmarks.

2. Reducing Carbon Emissions in Freight Transportation through Advanced Fleet Management: A Machine Learning Approach (13:30-13:55)

Grigory Pishchulov, Tim Gruchmann, Stefan Gold

Decarbonisation requires achieving net zero emissions of all CO₂ equivalents in the coming years to limit global warming to 1.5°C-2°C. Decarbonisation strategies in road freight transportation require improved vehicle efficiency, systematic changes to logistics processes, and the adoption of alternative fuels. The present study investigates route planning and fleet management in a road carrier company using telematics data from quantitative field research (N = 114). We employ regression trees and random forests, combined with explainable machine learning techniques, to identify the impact of tyre characteristics and telematics data

on fuel consumption and carbon emissions. Further, to support the carrier's decision-making, we propose a data-driven approach to optimal route selection, tyre characteristics, and driving speed that leverages recent advances in optimising tree ensembles. The proposed approach can be easily generalised for other carriers. Our analysis highlights the environmental benefits of combining external and internal factors in road freight transportation.

3. Does Cheap Electricity Necessarily Lead to Low Token Prices? (14:00-14:25)

Yuhan Guo, Zhangzhen Fang, Gaoxiang Lou, Zhixuan Lai

Competition among Generative AI service providers has extended upstream to Power producers. Lower generation costs are generally expected to reduce AI service prices, but we find that this is not always the case. We develop an analytical model of two competing, vertically structured AI-Energy supply chains. Their Power producers face different generation costs, their Generative AI service providers choose model quality and per-token prices, and Consumers choose between the services. A lower generation cost always produces a lower electricity price, but not necessarily a lower token price. When training is relatively inefficient, inference-cost savings dominate and cheaper electricity supports a lower token price. As training becomes more efficient, the provider invests more of its energy cost advantage in quality; once the quality premium outweighs the inference-cost saving, cheaper electricity supports a higher token price. The lower-cost provider nevertheless offers higher quality, serves more demand, and uses more electricity, so an energy advantage can affect quality and regional load far more than market share. Better training efficiency can raise consumer surplus while lowering both supply chains' profits. Quality coordination in the higher-cost chain can benefit that chain and Consumers at its rival's expense, while a common decline in generation costs can raise token prices, electricity use, and consumer surplus even as both chains earn less. Power producers should therefore account for downstream quality and load responses when pricing electricity, while Generative AI service providers should use cost advantages for price-led expansion when training is inefficient and for quality differentiation when training is efficient.

Session 2: Green Energy & Electric Vehicle Ecosystems

Location: Lecture Theatre 3 (Lowe Memorial Lecture Theatre)

Chaired by Muhammad Ahmad Iqbal

1. Hybrid Selling-Leasing Strategies in Closed-Loop Supply Chains for Electric Vehicle Batteries with Echelon Utilization (13:00-13:25)

Phuc Nguyen, Petros Ieromonachou, Duy Tan Nguyen, Li Zhou

The rapid growth of the electric vehicle (EV) industry has raised increasing environmental concerns regarding the disposal of end-of-life EV batteries (EVBs). In response, the closed-loop supply chain (CLSC) has attracted growing attention because it enables the integration of forward and reverse flows, facilitating the recovery of valuable materials while reducing hazardous battery waste (Gu et al., 2025). Within EVB CLSCs, existing studies mainly focus on the traditional selling mode, in which consumers purchase the battery together with the EV. Meanwhile, product leasing has increasingly emerged in the EV industry because it can reduce consumers' upfront purchasing costs, facilitate battery maintenance and improve environmental sustainability by enabling more effective control of used batteries (Varghese et al., 2026). Existing leasing studies mainly focus on the battery-swapping operations within the "Vehicle-Battery Separation" framework (Li & Yuan, 2025; Zhang et al., 2025) or the analysis of customer preference and utility (Huang et al., 2021; Yang et al., 2020). However, limited attention has been paid to pricing decisions for leasing models within EVB CLSCs, where leasing decisions can influence both market demand and battery recovery activities (Ma et al., 2026). At the same time, echelon utilization is also an important research stream in EVB management due to the remaining residual capacity of retired batteries. Although several CLSC studies include echelon utilization into optimization models, it is often treated as an exogenous process (Zhang et al., 2024; Zhu et al., 2024) rather than an independent strategic decision-maker within the supply chain (Gu et al., 2025). Furthermore, most studies investigating echelon utilization are developed under the battery selling mode, with limited consideration of leasing-based recovery structures. To address these gaps, this study examines pricing decisions in an EVB CLSC under the coexistence of selling and leasing modes while modelling echelon utilization as a strategic decision-maker under both centralized and decentralized structures. The research questions are: (1) What are the optimal pricing decisions that maximize the overall EVB CLSC profit under the coexistence of selling and leasing modes? (2) How does leasing preference affect hybrid selling-leasing strategies in EVB CLSC? (3) How does the maintenance effort affect profitability in EVB CLSC? (4) Which structure is more profitable between centralized and decentralized systems under hybrid selling-leasing strategies in EVB CLSC?

2. Which Vehicle, Whose Network? Joint Vehicle Development and Charging-Network Deployment for Vehicle-to-Grid (V2G) Commercialization (13:30-13:55)

Yuhan Guo, Zhangzhen Fang, Gaoxiang Lou, Wenjie Luo, Zhixuan Lai

Vehicle-to-grid (V2G) technology can transform electric-vehicle batteries into distributed energy-storage resources, but commercialization requires vehicle development, consumer participation, and charging-network deployment to generate sustainable returns. We develop a four-stage game among a manufacturer, a third-party charging service provider (TSP), and heterogeneous consumers. We compare six configurations combining a conventional electric vehicle (EV) or a V2G-enabled EV (V2G-EV) with manufacturer-only, TSP-only, or hybrid charging-station deployment, and examine the manufacturer's vehicle choice, both firms' deployment preferences, and their interaction. We find that V2G-EV adoption depends on the participation reward, participation inconvenience, and the V2G-EV cost premium. Greater inconvenience or cost premium discourages adoption, whereas a higher reward does not always promote it. Under TSP-only deployment, once the reward exceeds the level maximizing the TSP's retained revenue, further increases reduce vehicle demand and manufacturer profit when the TSP is relatively efficient at network deployment. Larger existing TSP networks or lower expansion costs make TSP-only deployment more attractive. Under hybrid deployment, with a relatively efficient TSP, the manufacturer can raise profit by moderately reducing its revenue share, thereby expanding network coverage and vehicle sales. Vehicle choice and deployment mode reshape each other's optimality conditions: deployment-specific investment costs and revenue allocation affect V2G-EV adoption, whereas vehicle type alters both parties' deployment preferences through consumer utility, infrastructure cost, and operating revenue. Interestingly, a mature public charging network need not promote V2G-EV adoption. When the reward is low or the cost premium is high, a conventional EV with TSP-only deployment becomes preferable and crowds out V2G-EV adoption.

3. Identifying Macro-Influencing Drivers towards Solar Irrigation Pumps (SIPs) Readiness in Bangladesh: A Bibliometric-PESTLE Study (14:00-14:25)

Honey Yadav, Shishank Shishank, Navjot Sandhu, Lynsey Melville, Florimond Gueniat, Cham Athwal, Sandeep Dhundhara, Khondokar Mizanur Rahman

Solar Irrigation Pumps (SIPs) represent a reliable, non-polluting, and cost-effective irrigation solution in South Asian countries such as Bangladesh. Despite the various benefits of solar pumps, their adoption remains scanty in Bangladesh. The present study performs a bibliometric literature review incorporated with a text mining approach to support the analytical literature review process. The study aims to identify macro-influencing drivers using the PESTLE framework that affect SIPs'; scalability in Bangladesh. To contextualise,

we conducted 32 semi-structured stakeholder interviews in Bangladesh using a qualitative methodology. The results indicated 55 factors among prominent PESTLE macro-influencing drivers in Bangladesh. The political and legal factors highlight the importance of policy stability, regulation clarity, and efficient institutional coordination to reduce uncertainty and foster continuous investment and planning. Whereas, inconsistent or fragmented policies implementation hinder scalability, especially when groundwater management, renewable energy development, and agricultural goals are misaligned. The economic dimensions emphasizes the necessity of shifting from short-term, subsidy-dependent deployment to financially sustainable and resilient alternatives. Although subsidies acted as significant drivers, sustainable adoption relies on cost-recovery techniques, equitable tariff structures, and varied revenue streams adapted towards local income levels. Hybrid finance strategies, including fee-for-service contracts, excess electricity sales, and feed-in tariffs, offer avenues to improve financial sustainability while inclusively accommodating small and marginal farmers. Thus, the findings provide a macro-environmental analysis that lays a solid, evidence-based foundation for socio-technical systems analysis within the realm of SIPs-enabled water and energy infrastructures.

4. Joint Optimization of Production Rate and Sustainability Costs in a Multi-Buyer Vendor System (14:30-14:55)

Muhammad Ahmad Iqbal

This paper presents a problem of supply chain with multiple buyers and a single vendor; here, the increase in demand required a reactive production line. Fixed-rate production systems fail to respond to dynamic settings. In this study, the production rate is assumed to be variable to measure its effect on product quality. The goal is to determine how to adjust the production rate to improve product quality and reduce costs. To recognize the cost-effective plans, optimization models are used in addition to a sensitivity analysis on a case study.

Session 3: Strategic Networks & Governance

Location: Executive Suite 3

Chaired by Sahar Gholamali

1. Innovation Spillovers in Buyer-Supplier Relationships: The Moderating Role of Board Interlocks (13:00-13:25)

Luodi Pan, Yuan Yuan, Mehmet Chakkol, Antonios Karatzas

This study examines how boundary-spanning leadership, enacted through board interlocks, shapes innovation spillovers in buyer-supplier relationships. We argue that interlocks linking suppliers to innovative buyers create conduits for accessing valuable knowledge and improving strategic alignment. Using multi-source data on supply chains, board networks, and firm performance, we find that suppliers connected to highly innovative buyers via board interlocks achieve superior innovation productivity. This effect depends on the characteristics of knowledge source and supplier's absorptive capacity. Our findings position boundary-spanning leadership with highly innovative buyer as a governance mechanism enabling inter-organisational innovation spillovers under conditions of sufficient absorptive capacity.

2. Do Supply Chain Network Characteristics Amplify Product Recall Impacts? Evidence from Automotive Supplier Networks (13:30-13:55)

Zhu Wanlin, Wang Xiangqian, Yang Chaoyu, Xu Ying, Cui Xingwen

Product recalls can generate substantial market losses, yet recalls of similar severity often lead to heterogeneous sales consequences across vehicle models. This study explains this variation from a supply chain network perspective. Using data on automotive supplier relationships, model-level sales, and product recall incidents, the study constructs a vehicle-model-level supply chain network in which models are represented as nodes and shared supplier relationships define ties. It examines whether network centrality and node strength amplify post-recall sales losses. The study aims to reveal how supply chain structure shapes the market consequences of product quality risks and provides empirical evidence for product recall management, supply chain resilience, supplier governance, and quality risk management.

3. Cryptocurrency Payments: Friend or Foe? (14:00-14:25)

Mohammad Moshtagh, Maryam Motamedi

Cryptocurrency payment acceptance is increasingly becoming an operational decision rather than a purely financial or technological choice. We study how accepting cryptocurrency affects a firm's pricing, product-quality investment, profit, and welfare. In our model, the firm chooses price and quality, while consumers decide whether to purchase and whether to pay through the traditional channel or with cryptocurrency. Cryptocurrency acceptance affects the firm through two channels: a demand-expansion channel, which attracts crypto-oriented customers, and a revenue-quality channel, which determines whether crypto-paid sales are more or less valuable after conversion costs, retention, market trend, and volatility are considered. We derive closed-form price and quality decisions under a traditional benchmark and a cryptocurrency-payment regime. The results reveal that cryptocurrency acceptance can improve quality when crypto-paid sales are sufficiently valuable, but it can reduce quality when adoption mainly brings revenue-dilutive demand. Price and quality may also move in opposite directions: in weak crypto markets, the firm may charge more while investing less in quality, whereas in favorable markets it may lower price and improve quality because crypto-paid sales become more profitable. Volatility plays a particularly important non-monotone role. When volatility is too low, cryptocurrency payment generates little attention or customer excitement; when volatility is too high, payment risk dominates and weakens adoption value. At intermediate volatility, however, cryptocurrency is salient enough to attract customers without becoming excessively risky, leading to the strongest profit gains. Finally, retention can serve as a commitment mechanism: by holding a larger share of crypto receipts, the firm signals confidence in the payment ecosystem and benefits more from favorable market trends.

4. Assessing Strategic University Merger Decisions Under Temporal and Uncertainty Complexities: A DEA-Based Framework (14:30-14:55)

Sahar Gholamali, Adel Hatami-Marbini, Nima Dadashzadeh

Higher education institutions are facing increasing financial pressures, policy changes, and growing uncertainty. In the UK higher education sector, these challenges have intensified concerns regarding institutional sustainability and have increased interest in university mergers as a potential strategic response. By combining resources, capabilities, and expertise, mergers may offer opportunities to improve efficiency and long-term resilience. However, evaluating the potential benefits of mergers remains a significant challenge. Strategic merger decisions are often made under uncertain conditions, and their outcomes may take several years to be observed which make temporal and uncertainty complexities important considerations that are rarely incorporated into existing performance assessment approaches.

This research first leverages expert interviews with higher education leaders to identify performance indicators and contextualise time-lag and data uncertainty in merger process, and then develop a Data Envelopment Analysis (DEA) framework to assess the potential efficiency gains from university mergers prior to actual merger implementation. The proposed framework aims to support strategic decisions by providing a more realistic assessment of potential merger outcomes under complex conditions. The framework will be applied to real UK university data to evaluate potential merger scenarios and assess their efficiency implications. By incorporating temporal and uncertainty complexities into DEA-based merger assessment, the study addresses an important gap in the higher education literature and provides a more comprehensive approach for evaluating potential merger gains prior to implementation.

Session 4: Industry 5.0 & Impact Measurement

Location: Seminar Room 1

Chaired by Henry Alterio

1. The impact of Industry 5.0-driven manufacturing on environmental sustainability performance in the United Kingdom and Austria (13:00-13:25)

Modupe Ferreira, Alireza Shokri, Marcelo Martins Sa

The manufacturing industry is crucial to global economic development but faces intense competition and challenges related to safety and environmental sustainability (Atif, 2023; Constance Obiuto et al., 2024). These concerns, including well-being, resource depletion, ecological damage, climate change, and greenhouse gas emissions, have led consumers and manufacturers to prioritise environmental sustainability (Enyoghasi & Badurdeen, 2021). Despite these obstacles, manufacturing remains a key driver of human development and economic growth, while meeting the rising demand for affordable goods (Starzyńska et al., 2021). Over the past two decades, societal attitudes have shifted, shaping public perception and influencing environmental sustainability (Wackernagel et al., 2021). To enhance production processes and the efficiency of material, energy, and resource use, the manufacturing industry has adopted innovative technologies and techniques, including lean and green manufacturing practices (Shahbazi et al., 2016; Ishola, 2019; Ntibrey et al., 2020; Jwo et al., 2021). This study seeks to analyse how AI-driven human-machine collaboration, manufacturing technologies, and techniques can integrate green manufacturing practices at a regional level. The objectives guiding this research are described below: 1. To review the existing academic literature on the efficacy of human-focused advanced technology-driven efficient manufacturing practices in influencing green manufacturing credentials. 2. To assess

managers' and practitioners' viewpoints towards the impact of disruptive technologies on environmental sustainability performance and green manufacturing credentials in the United Kingdom and Austria. 3. To analyse the differences in organisational practices in human-machine collaboration between the United Kingdom and Austrian manufacturers and their impact on utilising AI-driven human-machine manufacturing practices to promote green credentials.

2. Why XR Fits Differently: Frontline Perceptions of Task-Technology Fit in Field-Based Service Operations (13:30-13:55)

Shima Yekkehbashheidari, Yingli Wang, Daniel Eyers, Anasol Peña-Rios, Jean-Paul Skeete, Yu-Kun Lai

Field-Based Service Operations (FSOs), including maintenance, logistics, emergency response, and home visitation, are characterised by distributed, safety-critical, and high-uncertainty work environments. They place responsibility for planning, access management, and on-site execution on providers, increasing operational complexity and performance challenges. Despite growing interest in XR for FSOs, research remains largely proof-of-concept and offers limited theoretical explanation on why frontline professionals evaluate XR technologies differently across service contexts. Drawing on Task-Technology Fit (TTF) theory, this study examines how frontline professionals evaluate XR-task fit in FSOs. Using an abductive approach, data from 22 professionals across five FSO contexts were analysed and interpreted through the lens of Diffusion of Innovation (DOI) theory. Findings suggest that XR functionalities enhance perceived fit across response, on-site, and post-field activities by supporting adaptive communication, knowledge application, and safety assurance. However, perceived fit was shaped not only by task-technology alignment but also by four innovation-related perceptions: compatibility with service norms, complexity, trialability, and observability. Compatibility concerned beliefs about who services should benefit and what constitutes legitimate service delivery; complexity reflected usability under FSO conditions and workflow integration; trialability emphasised safe, progressive, and realistic experimentation; and observability concerned evidence of benefits, feasibility, organisational value, and credibility. As the first study examining XR modalities across diverse FSO contexts, it resulted in an integrated TTF-DOI model of XR adoption in FSOs and developed propositions and measurement scales for future empirical validation while offering practical guidance for the design, deployment, and evaluation of XR technologies in field-based service settings.

3. The Price of Resilience: Human-Centric Multi-Objective Sourcing for Low-Carbon, Disruption-Resilient Construction Supply Chains (14:00-14:25)

Abdirahman Hussein Muse and Mohamud Abiib

Industry 5.0 reframes supply chain optimisation as a human-centric activity in which algorithms are expected to widen, rather than replace, managerial judgement. Construction sourcing exposes this requirement acutely: emerging-economy infrastructure depends on imported cement and steel moving along fragile maritime corridors, where resilience, cost and embodied carbon stand in direct conflict. Existing studies address resilience or decarbonisation, seldom both, and typically collapse the resulting trade-off into a single weighted objective, thereby removing the procurement manager from the decision. This study formulates a three-objective, scenario-based stochastic sourcing model that minimises landed cost, embodied carbon, and disruption exposure, expressed as conditional value-at-risk of delivery delay across port-congestion, supplier-failure and freight-shock scenarios. Solved with NSGA-II and MOEA/D and validated on the Taiwan-East Africa cement and steel corridor, the model preserves the full trade-off surface, subsequently navigated through entropy-weighted TOPSIS with elicited planner preferences. The findings challenge a prevailing assumption. Resilience is inexpensive at the margin but increasingly costly beyond a critical knee point: a 4.8% increase in procurement cost reduces delivery disruption risk by 41.6%, whereas eliminating the residual 12.3% requires a further 9.7% cost increase. Dual sourcing across two ports decreases disruption exposure by 36.2% while increasing embodied carbon by 7.4%, a conflict that single-objective optimisation conceals. Preference-elicited knee-point solutions improve resilience-per-dollar by 28.5% relative to cost-minimising sourcing. Coupling stochastic sourcing, resilience and embodied carbon while retaining human decision authority yields not a superior optimum but a superior decision, and quantifies the price a construction buyer pays for supply chain resilience.

4. Natural Capital Values: On to highlight and communicate positive economic impacts of companies' environmental investments through a technological platform - A case study (14:30-14:55)

Henry Alterio, Paula Bautista, Valentina Amador, Germán Rivera

Companies are increasingly investing in sustainability initiatives, but the true impact and value generated by these actions is often difficult to quantify and communicate beyond conventional ESG reporting. In this study, we show how Environmental Economic Valuation and GIS can come together to complement corporate sustainability reporting by translating environmental impacts into traceable and comparable indicators that support evidence-based management, continuous monitoring, and more informed sustainability investment decisions. Nutresa, one of Latin America's largest food companies, is used as a case study based on

publicly available information. Four sustainability indicators were evaluated: solid waste, pollutant emissions, water consumption, and biodiversity conservation. Environmental economic valuation methods were applied to estimate the monetary value of avoided externalities and ecosystem services, and spatial analysis supported the visualization and distribution of positive outcomes. Results were integrated into the EBI-Ecosimple platform, a GIS-based analytical tool that consolidates sustainability indicators into a dynamic dashboard for monitoring and communication. The analysis estimates that, in 2024, corrective and resource-efficiency measures represented annual accounting for USD 1.60 million, while conservation actions in two protected areas generated around USD 18.15 million in the same period, from ecosystem service provision. Together, then, these benefits total USD 19.75 million, which represent approximately 11.6% of the Nutresa's 2024 net income.

Session 5: AI Integration & Strategic Transformation

Location: Seminar Room 2

Chaired by Hannah Ayeni

1. It is a Balancing Game: How AI Symmetry in Supply Chains Affects Firms' Operational Efficiency (13:00-13:25)

Meiting Lin, Hugo K.S. Lam, Jason Choi, Yangchun Xiong

Artificial intelligence (AI) is widely expected to enhance operational performance, yet many firms in the real world struggle to actually realize value from AI adoption. Despite the rapid growth of AI adoption, existing research focuses primarily on AI implementation within individual firms and pays limited attention to the supply chain context. In this study, we address this gap by examining how AI capability symmetry between firms and their suppliers in the supply chain influences firms' operational efficiency. Using a dynamic panel dataset of S&P 500 firms from 2005 to 2021 and employing a system generalized method of moments (GMM) approach, we find that AI capability symmetry between firms and their suppliers has a positive effect on the firms' operational efficiency. Building on the opportunity–motivation–ability (OMA) framework, we further show that this positive effect is more pronounced for firms with higher R&D intensity and those operating in more dynamic industry environments. These results remain robust across various alternative model specifications and additional analyses. Overall, we highlight the importance of cross-organizational AI capability alignment in realizing operational benefits from AI adoption and provide new insights into AI adoption for supply chain management.

2. Artificial Intelligence in Supply Chain Operations-Interfaces: An Integrative Literature Review (13:30-13:55)

Shivani Mishra, Eric Ka Ho Leung, Shenghao Xie, Jason Choi

Artificial intelligence (AI) is rapidly deployed across supply chain operations, yet most existing research examines AI within individual functions rather than at the cross-functional boundaries where supply chain value is created and coordination failures most frequently occur. This paper argues that AI at operations-interfaces, primarily the boundaries between operations and marketing, finance, accounting, and information systems, constitutes a distinct coordination challenge that existing reviews have not addressed as a primary unit of analysis. Drawing on an integrative review of 142 peer-reviewed articles and grounded in the Dynamic Capabilities View and the Relational View, we identify three mechanism regimes through which AI reconfigures interface coordination: the AI-mediated Information Regime (AIR), which transforms sensing and communicative capabilities; the Decision Governance Regime (DGR), which redistributes decision authority between human and algorithmic agents; and the Relational Configuration Regime (RCR), which reshapes trust, power, and data-sharing willingness. The central finding is a regime imbalance where the field has advanced AIR substantially while DGR and RCR remain underdeveloped. This explains why technically capable AI deployments frequently fail to deliver cross-functional value. Two recurring cross-interface tensions are identified: a transparency-security paradox at operations finance interface and a governance vacuum at the human-AI authority boundary across all four interfaces. These regimes are synthesized into the proposed AI-SCM Interface Framework (ASIF), with maturity trajectories and a targeted research agenda. This study provides interface-specific guidance on investment prioritization, decision-rights design, and the governance of cross-functional data sharing for managers moving from AI experimentation to scaled deployment.

3. GenAI-Driven Supply Chain Strategy (14:00-14:25)

Jane Ugbari, Yashar Salamzadeh, Nadja Damij

Research on Generative Artificial Intelligence (GenAI)-driven Supply Chain Strategy (SCS) is primarily future-oriented, focusing on the use of GenAI tools such as ChatGPT. However, there has been limited exploration of GenAI within the context of SCS design. Considering organisations are increasingly interested in how GenAI creates new opportunities and the need for effective strategy-as-practice. This study aims to develop a GenAI-driven SCS design framework that incorporates global supply chain management resources. Maximising the transactional benefits of adopting GenAI-driven SCS while contextualising these benefits through innovation ambidexterity. This study employs a semi-systematic literature review, following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses

framework for data collection and analysis. The research reveals that supply chain integration is a crucial factor that influences GenAI-driven SCS design. Through an organisation's SCS structure and overall supply chain performance, facilitating organisational readiness to balance its infrastructure and governance while making competitiveness a key strategy. Highlighting the importance of a firm's ability to integrate, build, and reconfigure in rapidly changing environments. A GenAI-driven supply chain design emphasises the need to effectively utilise existing organisational capabilities while incorporating innovative functionalities. Establishing the requirements for competencies in strategy-as-practice that fosters cost-efficient innovations through enhanced supply chain performance. This study enhances the understanding of how GenAI capabilities influence SCS design, facilitating the diversification of an organisation's value proposition.

4. Strategic AI Transformation in UK SMEs: A TOE-DCT Framework for Supply Chain Excellence (14:30-14:55)

Hannah Ayeni

Artificial intelligence is reshaping supply chain operations across sectors, yet most empirical research continues to focus on large multinational corporations. UK small and medium-sized enterprises, which account for 99.9 percent of businesses and over 60 percent of private sector employment, remain largely absent from this literature. Even where adoption has been studied, what happens afterwards has received little systematic attention. How SMEs convert AI capabilities into sustained supply chain performance, and why many fail to do so, remains an open question in the UK context. This study which is still in early stage aims to develop and validate a configurational framework integrating the Technology-Organisation-Environment (TOE) framework with Dynamic Capability Theory (DCT) to address this gap. TOE captures the technological, organisational, and environmental conditions shaping AI adoption in UK SMEs, while DCT explains how firms sense, seize, and reconfigure capabilities to translate adoption into supply chain excellence across four dimensions: efficiency, agility, resilience, and effectiveness. The study will employ a sequential exploratory mixed-methods design. Phase one will involve semi-structured interviews with UK SME practitioners to examine AI capability development and identify barriers and enablers. Phase two will test causal relationships through PLS-SEM and configurational pathways through fsQCA. Phase three will validate the framework through expert focus groups. The expected contribution is a novel TOE-DCT configurational framework for AI-enabled supply chain excellence in UK SMEs, offering evidence-based guidance for practitioners and policymakers seeking to close the gap between AI adoption and sustained supply chain excellence.

Session 6: Industry 5.0 & Human-Centric Systems

Location: Middleton Lecture Theatre

Chaired by Yober Arteaga Irene

1. Industry 5.0 Implementation in Supply Chains: Framework and Impact (13:00-13:25)

Abhijeet Ghadge

This research investigates the transformative potential of Industry 5.0 (I5.0) on supply chains, through the integration of human-centric technologies, sustainability innovations, and resilient architectures. In particular, this study examines how implementation of I5.0 technologies impacts supply chain management with focus on enhancing efficiency, sustainability, and resilience. A review of 72 high quality, peer-reviewed studies (2022–2026), the research identifies key benefits, including improved operational performance, resource optimization, and adaptive capabilities. It also outlines the core principles, adoption determinants, and practical applications of I5.0 paradigm in supply chains. A conceptual framework is developed, highlighting the centrality of humans in technological advancements, where innovations such as collaborative robots (cobots), AI-augmented decision-making, and worker empowerment foster well-being, creativity, and inclusivity. The framework provides actionable insights to address challenges like high implementation costs, skills gaps, and regulatory complexities. By bridging theory and practice, this study offers a structured approach to I5.0 adoption, paving the way for future research and equipping organizations with tools to build sustainable and resilient supply chains in an evolving industrial landscape. The findings highlight the importance of aligning technological advancements with human-centric values to create long-term societal and environmental benefits.

2. Cognitive-Computational Decision Governance for Operations and Supply Chain Management Under Industry 5.0 (13:30-13:55)

Pritam Kumar Patro, Francisco Saldanha-da-Gama, SC Lenny Koh

The surging of artificial intelligence (AI) in operations and supply chain management (OSCM) has produced extensive research on technology adoption and digital transformation. Yet existing frameworks treat human and artificial intelligence as points on a single continuum, shadowing a fundamental asymmetry: AI now largely subsumes computational intelligence - pattern recognition, optimisation, and predictive analytics at scale - while cognitive intelligence, the capacity for ethical judgement, sensemaking under genuine novelty, and relational meaning-making, remains irreducibly human. We argue this asymmetry is a durable feature of the human–AI boundary that current theory inadequately addresses. Drawing on bounded rationality, distributed cognition, sensemaking, absorptive

capacity, agency theory, and dynamic capabilities, we develop the Cognitive-Computational Decision Governance (CCDG) framework - a two-dimensional typology mapping decision authority across situational novelty and ethical stakes - and introduce Intelligence Boundary Management (IBM) as a new dynamic capability. The framework is empirically validated through analysis of over 1200 documents, such as peer-reviewed papers and management communications from various supply chain firms. We used topic modelling and dual-method sentiment analysis. Findings reveal a significant theory-practice gap: management communications show substantially higher human-dominant decision discourse (24.5%) than academic literature (4.5%), a 20-percentage-point divergence validating the framework's core proposition. Management sentiment is markedly more cautious than academic discourse, and human oversight language is consistently linked to more positive framing in both streams. The paper extends bounded rationality and dynamic capabilities into the Industry 5.0 context, offering governance guidance for OSCM professionals navigating the human-AI boundary.

3. A Thematic Framework for Emergence of Human-Centric Digitalisation of Operational Excellence (OPEX5.0) (14:00-14:25)

Alireza Shokri and Jiju Antony

Integration of operational excellence (OPEX) with AI technologies in the era of human-centric Industry 5.0 (I5.0) called OPEX5.0 with theoretical lensing is scarce. With the lens of AI-driven Intelligent Social-Technical Systems (iSTS) theory, the purpose of this study is to shed light on emergence of human-centric operational excellence (OPEX) in the era of Industry 5.0 (I5.0) called as OPEX5.0 through a thematic framework. Taking the “exploratory sequential mixed methods” approach, we conducted 36 interviews and 214 survey questionnaires amongst OPEX experts across the world through three empirical sequential phases. Underpinned by the iSTS theory, a new verified thematic framework was developed suggesting the inevitable emergence of OPEX5.0 with some degree of feasibility and required further investigation. With evidence of filling the gap in the iSTS theory by extending it into automation-driven OPEX, this is the first empirical study to validate the conceptual iSTS theory and its three levels of individual/human, organisation and technology ecosystem suggesting blur boundaries between them. Our findings demand further empirical quantitative study and iSTS theory-related case studies to follow the verified thematic framework generating outcomes such as analytical frameworks and implementation roadmaps. This study helps OPEX experts and leaders in organisations enlightening their visionary leadership. It supports forward thinking leadership which embraces ethical and socially responsible human-centred and AI-enabled OPEX5.0 with social, environment and economic benefits.

4. Integrating Smart Manufacturing Technologies into Production Planning and Control: A Unified Framework (14:30-14:55)

Yober Arteaga Irene, Tahir Syed, Fahian Huq

Smart manufacturing (SM) is increasingly viewed as a critical mechanism for sustaining competitiveness in industrial manufacturing. However, despite growing adoption, its comprehensive integration into production planning and control (PPC) processes remains conceptually fragmented and managerially unclear. This study develops a comprehensive framework for understanding PPC in smart manufacturing environments. Drawing on a systematic review of the literature published over the past decade, the study explains how SM technologies reshape planning, scheduling, monitoring, and control practices across strategic, tactical, and operational decision-making levels. The framework further identifies the mechanisms through which these changes influence economic, environmental, and social performance outcomes. By positioning PPC as the organisational interface through which smart manufacturing technologies create value, the study advances operations management theory and contributes to the discussion on smart manufacturing-enabled decision-making. The findings also provide managers with a structured approach for aligning SM initiatives with PPC practices and performance objectives, thereby supporting more effective digital transformation strategies.

2 September 2026 Wednesday, 13:30 – 15:30

Session 1: Logistics, Platforms & Sector Innovation

Location: Lecture Theatre 2

Chaired by Jie Ma

1. Extending the Technology Acceptance Model: Integrating Innovation Attributes and Cognitive Styles in User Acceptance of Autonomous Delivery Vehicles (13:30-13:55)

Yu Zhuoxi

The successful implementation of Autonomous Delivery Vehicles (ADV) hinges on user acceptance. To address existing theoretical ambiguities, this study develops and validates a comprehensive model integrating the Technology Acceptance Model (TAM), Diffusion of Innovation (DOI) theory, and Kirton's Adaption-Innovation Theory. Data were collected from 388 experienced early adopters in China via an online survey, and the model was analysed using Partial Least Squares Structural Equation Modelling (PLS-SEM). The results confirm that relative advantage and compatibility positively influence attitude, which in turn predicts usage intention. However, by using collected cross-sectional sample, both perceived risk and complexity were found to have a significant positive influence on attitude in this specific context. Furthermore, Kirton's cognitive styles exerted a direct positive effect on usage intention rather than a moderating one. A multi-group analysis revealed distinct acceptance pathways: men's attitudes were driven by utilitarian factors (e.g., compatibility), while women's were driven by experiential factors (risk and complexity), with women also demonstrating a stronger intention to recommend the service. This study contributes to the literature by challenging the conventionally negative roles of risk and complexity for experienced users and proposing a new integrated framework. The findings offer practical insights for developing phase-based and gender-differentiated marketing strategies and inform human-computer interface design for ADVs.

2. Who Will Benefit from Returnless Refunds? Platform Design with Opportunistic Consumers (14:00-14:25)

Xiahui Sun, Li Hu, Jason Choi

The returnless refund policy has been widely adopted by many e-commerce platforms. These platforms hope this policy will encourage consumers to make purchases and raise merchants' quality standards, but it can be exploited by opportunistic consumers who file fraudulent

claims, causing financial losses for merchants. This paper constructs a theoretical model to analyze the consequences of introducing a returnless refund policy and to study how the platform's policy leniency affects outcomes. We model the platform's policy leniency as the eligibility criterion for approving refund requests, which addresses fraudulent claims: the more lenient the policy, the lower the effort required for consumers to commit no-return fraud successfully. The analysis demonstrates that, in the presence of opportunistic consumers, returnless refunds can effectively discourage low-quality merchants from participating on the platform, but fail to reliably boost the successful product sales. The positive effect on sales is only observed for products with relatively low salvage values. Contrary to conventional wisdom that merchants would raise prices to compensate for refund-related losses, we show that when policy leniency is moderate and the reduction in hassle costs is limited, merchants may find it optimal to lower retail prices. In addition, when the platform endogenously determines the level of policy leniency, both the platform and consumers potentially achieve their maximum surpluses, whereas merchants prefer a stricter policy. Surprisingly, our results further reveal that a higher fraction of opportunistic consumers may lead the platform to choose a more lenient returnless refund policy.

3. Offsite Construction and Supply Chain Performance: Evidence from UK Award-Winning Firms (14:30-14:55)

Jie Ma

Offsite construction moves building production from the job site into a controlled factory environment, promising higher productivity through mass-production methods. Despite this potential, offsite construction firms account for only 5.9% of new construction output in the UK, exposing a gap between academic enthusiasm and industry uptake. This study examines the performance impacts and identifies the supply chain factors that could support its wider adoption. The study draws on a sample of UK offsite firms from 2015 to 2021. These firms are matched with comparable control firms not yet strongly engaged in offsite construction, using propensity score matching. Difference-in-difference analysis then tests changes in firm and supply chain performance over time. Firm performance is measured through inventory to asset ratio and total cost over sales, while supply chain performance is captured through aggregate indices of inventory and asset-based metrics. The findings show that offsite construction's manufacturing innovation depends on firms building strong supply chain management capabilities. This dependency helps explain why the offsite construction sector has developed slowly despite strong theoretical and policy support. Construction firms need to develop robust supply chain capabilities as a necessary condition for realising the benefits of offsite manufacturing.

Session 2: Advanced Analytics & Smart Operations

Location: Lecture Theatre 3 (Lowe Memorial Lecture Theatre)

Chaired by Sara Tavakoli

1. Digital Twin-Enabled Explainable AI for Sustainable Operations: A Vertical Farming Case (13:30-13:55)

Yujia Luo, Abhilash Puthanveetil Madathil, Ehsan Badakhshan, Peter Ball

Vertical farming requires precise environmental control through IoT-enabled monitoring systems, yet lacks transparent optimization frameworks that integrate predictive modeling with operational decision-making to balance productivity and resource efficiency. We developed a digital twin framework with explainable AI to forecast energy consumption and enable real-time optimization in container-based vertical farming. Two commercial container units cultivating lettuce over six months were equipped with IoT sensors measuring temperature, humidity, photosynthetic photon flux density, and CO₂. The digital twin employs artificial neural networks (ANN) and explainable AI (XAI) models for energy prediction, coupled with long short-term memory (LSTM) networks for time-series forecasting of chamber conditions. SHAP analysis quantifies the contribution of each environmental variable to energy consumption predictions. The XAI model achieved $R^2 = 0.73$ for total power prediction, with mean absolute percentage error (MAPE) of 4.27% for import power forecasting. The hybrid LSTM-ANN approach demonstrated superior performance with MAPE below 5% for energy prediction across variable environmental conditions. SHAP analysis revealed that temperature and humidity sensors accounted for the majority of prediction variance, enabling operators to prioritize control of these parameters. The framework provides quantifiable trade-offs between energy efficiency and crop performance, supporting transparent operational decisions. This proof-of-concept demonstrates that coupling digital twins with interpretable AI reduces resource intensity in controlled environment agriculture. The next research phase integrates simulation models, shifting from prediction to autonomous adaptive control where the system continuously learns and adjusts operating parameters to maximize resource efficiency while meeting production targets. Future validation will extend to commercial-scale facilities.

2. Topology-Aware and Adaptive Routing for Logistics: Graph Neural Networks and Reinforcement Learning (14:00-14:25)

Hajar Fatorachian

Road freight logistics operates within complex, dynamic networks where routing decisions must continuously respond to congestion, disruptions, and sustainability constraints. Traditional optimisation approaches, which assume stable and fully known conditions, are

limited in their ability to support adaptive and environmentally aligned decision-making. This study develops a topology-aware adaptive routing framework that integrates Graph Neural Networks (GNNs) with Reinforcement Learning (RL) to enable data-driven, context-sensitive routing under uncertainty. The GNN captures spatial and relational dependencies within the logistics network to predict per-edge performance indicators, including travel time, fuel cost, and CO₂ emissions. These predictions inform an RL-based policy that dynamically adjusts routing decisions through sequential learning, allowing the system to respond to evolving operational conditions. Empirical evaluation on a synthetic dataset representative of UK freight operations shows that the proposed framework maintains robust routing performance under disruption and supports improved alignment between efficiency and environmental objectives compared to static shortest-path benchmarks. The study contributes theoretically by operationalising Dynamic Capabilities Theory and the Knowledge-Based View, demonstrating how predictive and adaptive learning mechanisms can function as microfoundations of organisational sensing, seizing, and reconfiguring. It further shows that sustainability outcomes are shaped by governance priorities embedded within the decision process, rather than arising automatically from optimisation. Practically, the framework provides a scalable and interpretable architecture for logistics systems seeking to balance efficiency, resilience, and environmental sustainability in dynamic transport environments.

3. Strategic AI Information Distortion in Two-Sided Ride-Hailing Platform (14:30-14:55)

Jianan Wang, Ruiying Yuan, Jason Choi

Ride-hailing platforms increasingly use AI-generated information before any trip is matched. Riders see estimated pickup times and fares before requesting a ride, while drivers see heat maps, surge zones, or bonus areas before deciding where to wait or relocate. Our research studies how these signals can be used as a strategic tool to manage participation on both sides of the market. We develop a game-theoretic model in which a monopoly ride-hailing platform chooses price and one of four information strategies, including truthful disclosure, rider-side distortion, driver-side distortion, and two-sided distortion. Rider-side distortion makes pickup look more attractive, while driver-side distortion makes order opportunities look stronger. The model captures the trade-off between higher participation before matching and mismatch costs after demand and supply are realized. The platform does not always benefit from making information highly distorted. A more capable AI system can make smaller signal adjustments more effective, so visible distortion may fall even when the platform uses information more strategically. The model also shows that restricting distortion on only one side may shift the platform's incentive to the other side, rather than remove strategic information design. These results suggest that AI in ride-hailing is not only a forecasting tool. It is also a way to steer market participation before matching occurs.

4. From Data to Action: Advancing Industry 5.0 Goals of Inclusion and Resilience Through Energy Poverty Vulnerability Analytics (15:00-15:25)

Sara Tavakoli, Pedro Sampaio, Ali Hassanzadeh

Industry 5.0 calls for technological and industrial transformation that is human-centred, inclusive, sustainable, and resilient. Achieving these goals requires decision-makers to understand how energy vulnerabilities affect places and population groups differently. Energy poverty is shaped by demographic, health, housing, and energy-infrastructure conditions, yet conventional regional models typically treat these drivers as independent and additive. This can obscure the different combinations through which vulnerability emerges and limit the usefulness of modelling for place-based actions. This study develops a three-level, intersectionality-informed framework that links observed drivers to energy poverty through an intermediate layer of latent vulnerability configurations. The framework is applied to 533 Westminster Parliamentary Constituencies in England using 2021 Census data and the Low-Income Low Energy Efficiency index. Principal component analysis structures 155 retained drivers into eight latent configurations explaining 82.36% of variation in the driver space. These configurations are linked to constituency-level energy poverty through regression and compared with conventional two-level models. Permutation importance and Random Forest SHAP analysis support interpretation and robustness assessment. The results identify a dominant socio-economic configuration combining occupation, education, and health, alongside further configurations related to housing and heating infrastructure, life stage, employment, migration, tenure, and household composition. Constituencies with similar energy-poverty levels can therefore face different underlying vulnerabilities. Although the two-level model predicts more accurately, the three-level framework provides stronger diagnostic insight. It converts complex public data into actionable regional intelligence, supporting better targeting of income assistance, housing retrofit, infrastructure investment, and other locally appropriate interventions for an inclusive and resilient Industry 5.0 transition.

Session 3: Circular Economy & Sustainable Fashion

Location: Executive Suite 3

Chaired by Peiyi Liang

1. Fashion Circularity: Assessing Post-Consumption Reverse Logistics Network under Extended Producer Responsibility (13:30-13:55)

Marjan Olfati, Afshin Mansouri

The fashion industry faces substantial sustainability challenges, including intensive resource consumption, greenhouse gas emissions, and limited options for end-of-life management. Disposal routes, such as landfills and incineration, remain prevalent, while technological and economic barriers continue to limit large-scale textile recycling. These issues are further intensified by the expansion of fast fashion, overconsumption, and consumer reluctance to purchase second-hand or recycled clothing. Low participation in take-back schemes and the absence of effective policy instruments also constrain progress towards circularity. This study examines reverse logistics in the context of circular fashion, addressing a gap in the existing literature. It focuses on charity-led networks, which play a central role in the collection, sorting, and redistribution of used clothing. An operational research model is developed to optimise reverse logistics flows, with particular attention to selecting collection channels that enhance charity revenue and collection performance. A novel contribution of this research is the integration of Extended Producer Responsibility (EPR) policy assessment into the optimisation framework, enabling the evaluation of policy impacts on circular fashion systems. The study adopts a mixed-methods approach, combining a systematic literature review with field studies. The model is applied using empirical data from a medium-sized charity organisation. A bi-objective optimisation approach is designed, developed, and verified using large-scale primary data from Greater London, employing an improved augmented epsilon-constraint method to examine trade-offs between economic and environmental objectives. The results provide insights into reverse logistics design and policy measures, with implications for academic research, industry practice, and policymaking.

2. Human-Centric Emerging Technologies for a Circular Economy in the Global South: A Capability-Based Framework for Inclusive Circular Supply Chains (14:00-14:25)

Alka Ranjan

Emerging technologies are widely presented as the engine of the circular economy (CE), artificial intelligence for material sorting, blockchain for supply chain traceability and digital platforms for circular exchange. Yet these technologies rest on a hidden assumption, a formal

firm with capital, data infrastructure, and digital skills. In the Global South, most circular activity is instead performed by informal workers, whose recovery rates often match or exceed those of formal systems, a performance paradox invisible to mainstream CE metrics. In India's textile sector, over 70% of textile waste is recovered, largely through informal collection and sorting networks sustaining an estimated 4 to 4.5 million livelihoods. Technologies designed for formal-sector adoption risk displacing these workers, extracting the data they generate without returning value and erasing the tacit material knowledge on which recovery performance depends. This conceptual paper asks what genuinely human-centric circular technology looks like when the human at its centre an informal worker is rather than a factory operator. Drawing on an ongoing doctoral study of informal textile workers in India, it integrates the Capability Approach with Fraser's tripartite theory of justice to develop a framework and preliminary design principles for technologies, digital platforms, and governance instruments, such as extended producer responsibility, that augment rather than displace informal circular work. The paper thereby extends the human-centricity, sustainability, and resilience pillars of Industry 5.0 beyond the formal factory of the Global North, informing inclusive circular supply chain policy while formal instruments in these economies are still being designed.

3. Restoring the Apparel Supply Chains: A Regenerative Framework for Production in Sri Lanka (14:30-14:55)

Chamindri Nayanathara Sooriyabandara

The apparel industry is increasingly pressured by resource scarcity, ethical and circular production expectations and environmental degradation. Though major brands and retailers have begun integration of circular and regenerative strategies through waste elimination, product longevity and closed loop designs, it is evident that these practices remain absent in the upstream; manufacturing and production locations. These result in both ecological and social impact. This misalignment of circular and regenerative practices is clearly visible in emerging production hubs such as Sri Lanka where there is a greater contribution of the industry to the national economic performance. Nevertheless, the apparel manufacturing in Sri Lanka continues to heavily rely on virgin resources, heavy use of chemical for apparel dyeing and linear models despite the advancements in the downstream. The social implications, increasing ecological pressures and operational inefficiencies and risks emphasise the significant need of exploring why regenerative strategies have not been implemented upstream and how the gap can be addressed. The study investigates how regenerative strategies can be integrated within the upstream apparel supply chain through enhanced stakeholder collaboration. Drawing on relational view, adoption of regenerative practices through effective communication among upstream manufacturers and downstream brands and retailers, knowledge sharing and joint resource development and

inter-organisational relationships will be examined. Implementation of regenerative supply chain strategies moves beyond sustainability to restore the ecology with the reduced dependence on virgin raw materials, minimise the harmful chemical for apparel dying while generating a net positive social and environmental value. However, the upstream adoption is limited through financial constraints in the developing economies such as Sri Lanka, cultural differences, weak communication and collaborations and minimal access to innovation. Qualitative case-study approach to be used on Sri Lanka's apparel manufacturing sector to generate new insights related to the barriers preventing upstream adoption and integration of regenerative strategies and to investigate the collaborative mechanisms to facilitate the implementation. Theoretical contribution is by bridging sustainability and regenerative supply chain literature and the practical contribution is through the development of a framework to support regenerative transformation in manufacturing centres of emerging economies. The study focuses on informing how upstream and downstream partners can co-create value while reducing ecological harm and strengthening the global apparel supply chain resilience.

4. Achieving Net-Zero Carbon Footprint or Not: A Product Perspective (15:00-15:25)

Peiyi Liang, Jason Choi, Eric Ka Ho Leung, Zhen Xu

The increasing pressure to decarbonize supply chains has shifted managerial attention from firm-level emissions targets to the carbon footprint of individual products. Motivated by real-world examples, this study considers a supply chain consisting of a supplier with renewable energy efforts and a retailer with emissions abatement efforts. Utilizing game-theoretic models, we investigate whether a retailer should pursue a net-zero carbon footprint product strategy when its upstream supplier commits to renewable energy (RE) through two alternative sourcing patterns, namely power purchase agreements (PPAs) and renewable energy certificates (RECs). Our results show that, depending on the production capacity of PPA's renewable energy, the supplier is optimal to choose hybrid RE sourcing or 100% PPA sourcing. Under the hybrid RE sourcing, the production capacity of PPA's renewable energy increases in the order quantity and retailer's abatement level, benefiting supply chain members' profit while negatively influencing the final product's carbon footprint. While the carbon auditing cost coefficient on RECs has an opposite impact. Interestingly, when the retailer's abatement level increases, the supplier's ratio of joining PPA (buying RECs) decreases (increases). This means that with the higher retailer's emissions abatement efforts, the supplier tends to buy RECs even if it causes carbon audit costs, which ultimately worsens the retailer's profit.

Session 4: Supply Chain Resilience & Global Risk

Location: Seminar Room 1

Chaired by Filipe Sarmento

1. Sustainable Supply Chain Resilience Under Geopolitical Disruption: A Human AI Fluency Competency Framework for the GCC Region (13:30-13:55)

Ayesha Awan

Industry 5.0 emphasises human-centric, sustainable AI adoption in supply chain operations, yet the literature offers few actionable frameworks specifying the human competencies required to work effectively with AI systems under geopolitical disruption. This gap is particularly significant in the Gulf Cooperation Council (GCC) region, a critical global logistics corridor that remains vulnerable to regional instability. This conceptual paper applies the Dakan-Feller Framework for AI Fluency to sustainable supply chain management, synthesising literature across Industry 5.0, supply chain resilience theory, and human-AI interaction. It argues that supply chain resilience under disruption depends not on AI automation alone, but on how professionals interact with AI at critical decision points. The framework's four competencies (Delegation, Description, Discernment, and Diligence) are mapped across three human-AI interaction modalities to specific resilience and sustainability outcomes in GCC supply chain contexts, yielding a structured competency matrix as the paper's central conceptual contribution. Theoretically, this work bridges human-AI interaction and supply chain resilience literatures, extending the Dakan-Feller framework into operations management. For practitioners, it provides supply chain managers and logistics firms with a structured, technology-agnostic tool for workforce competency development, ethical AI governance, and human-in-the-loop decision protocols under disruption. The framework's design ensures transferability beyond the GCC to other geopolitically exposed logistics environments, and the paper establishes a clear foundation for empirical validation.

2. Developing Artificial Intelligence Capability for Supply Chain Resilience: An Industry 5.0 Conceptual Framework for UK Automotive Manufacturing (14:00-14:25)

Bridget Yellow-Duke

The UK automotive manufacturing industry faces unprecedented disruption from geopolitical instability, post-Brexit trade realignments, semiconductor shortages, electrification, and demands for responsible digital transformation. Consequently, building supply chains that can anticipate, adapt to, and recover from disruption is critical. While Artificial Intelligence (AI) is a strategic enabler of resilience, existing research largely focuses on technology adoption rather than how organisational AI capability contributes to resilience within

complex manufacturing ecosystems. Furthermore, research often overlooks the governance mechanisms required to ensure AI-driven decision-making remains transparent, accountable, and aligned with Industry 5.0 principles. This conceptual paper develops an integrated framework to explain how AI capability strengthens supply chain resilience in UK automotive manufacturing. Drawing on the Resource-Based View, Dynamic Capabilities Theory, and Stakeholder Theory, the framework conceptualizes AI capability as a multidimensional construct comprising technological, human, and organisational resources. It posits that AI capability enhances resilience by enabling organisations to detect disruption, grasp opportunities, and transform operations. Additionally, the study proposes ethical AI governance as a moderating mechanism to strengthen the relationship between AI capability and supply chain resilience through transparency, explainability, accountability, and stakeholder trust. The paper contributes to operations and supply chain management literature in three ways. First, it reframes AI as an organisational capability rather than a technological investment. Second, it integrates strategic management and supply chain resilience theories within an Industry 5.0 context. Third, it provides managers and policymakers with a conceptual roadmap for implementing trustworthy AI to strengthen resilience across UK automotive supply networks. The framework offers a foundation for subsequent empirical validation using Structural Equation Modelling (SEM).

3. Managing Operations Under Macroeconomic Frictions in Developing Economies (14:30-14:55)

S. Hamid Hashemi Petrudi

To explain how country-level macroeconomic frictions (inflation, exchange rate, political stability) shape firm-level operating costs and profitability in developing economies, and to identify operational mechanisms that moderate these effects. We merge LSEG Refinitiv firm-year data, annual earnings call transcripts, and World Bank indicators for 609 listed firms in 31 developing countries (2004 to 2024). Using a text-as-data approach, we construct sentence-based measures of operations-focused managerial attention and operational-risk attention, following Wu (2024), and estimate two-way fixed effects panel regressions with firm and year fixed effects for next-period cost of goods sold (COGS) and return on assets (ROA). Inflation is the most consistent friction. It increases next-period COGS and reduces next-period ROA, while exchange rate and political stability show weaker and less robust direct effects. Higher operations-focused managerial attention moderates inflation in both outcomes by weakening inflation pass-through into costs and attenuating inflation-related profitability declines. Buffer effects are outcome specific. Higher inventory turnover weakens the transmission of macro frictions into future COGS, while cash holdings are more relevant for protecting ROA, especially when exchange-rate pressure is higher. For operations managers, macro frictions are operational constraints, not background conditions.

The results point to an inflation-ready operating system that improves response speed and coordination, combined with high inventory turnover to curb cost pass-through into COGS and adequate cash buffers to sustain ROA under exchange-rate pressure.

4. System Dynamics Visualisation for Industry 5.0: Resilience-Sustainability Feedbacks in the UK Green-Steel Transition (15:00-15:25)

Filipe Sarmento, SC Lenny Koh

Sustainability transitions require organisational resilience, but they also reshape the conditions under which said resilience can be built. This study proposes a System Dynamics/causal-loop model to explain this two-way resilience–sustainability dynamic in the UK's green steel transition. Sustainability pressures reshape the possibilities for resilience through policy, qualifications, supply and technological constraints, while organisational resilience reduces the risks of transition by enabling continuity, learning and flexible adaptation. Empirically, the study connects two workshops. Workshop 1 used FPSCRS2, a scenario-based tool based on the Organisational Resilience Index developed by Koh et al. (2024), to examine how managers prioritise resiliency management, business continuity, organisational learning capacity and operational flexibility across political-economic, supply chain and product-technological disruptions under time pressure and uncertainty. Workshop 2 employed a web-tool and SD-oriented discussions to identify systemic barriers and feedback loops influencing the behavioural adoption of green steel. The key barriers identified were a low level of adoption (3.20/10) despite strong market/policy pull (6.50/10); weak supply confidence (2.42/10) due to grid access lead times of approximately five years, delays in scrap sourcing and qualification, and mismatches in policy and capability timing. The combined tools then form a human–machine collaborative visualisation layer that is consistent with resilience modelling in Industry 5.0 (Li and Duan, 2026; Wang et al., 2026) and supports managerial interpretation rather than automation-first optimisation. This study contributes to Industry 5.0 by exploring how SD-informed visualisation can render resilience–sustainability dynamics actionable within critical supply network transitions.

Session 5: Digital Integration in Supply Chains

Location: Seminar Room 2

Chaired by Colette Nsofor

1. Crafting the Contingent Capacities for Realising Blockchain Affordances in Supply Chains: Mechanisms and Tradeoffs (13:30-13:55)

Md Rokonzaman, Trevor Clohessy, Graham Heaslip, Sandy Schumann, George Onofrei, David Awe

Realising the affordances of blockchain technology in the supply chain into intended outcomes often associates significant difficulties. These difficulties usually arise from the misalignments of the intrinsic properties of the technology and the current system of work. It requires the supply chain stakeholders to use contingent capacities to address the misalignments. Drawing on the theory of workarounds, this research investigates the mechanisms that enable the supply chain stakeholders developing contingent capacities within the current work system. This research uses exploratory expert interviews followed by a focus group discussion of industry professionals from a range of blockchain developers, service providers, academics, and startup companies. It uses NVivo14 data analysis tool for coding transcripts and analysis of the findings. The analysis reveals four higher level workaround mechanisms that enables building the contingent capacities of the supply chain stakeholders. Relevant trade-offs, together with how they further affect the intended performance of the supply chain are also demystified. This research suggests that the contingent capabilities should be accommodative into the design and infrastructure of blockchain technology to realise its affordance across the supply chain network.

2. The Dual Impact of Blockchain on Sustainability of Closed-Loop Supply Chains for Critical Products (14:00-14:25)

Nazanin Nami, Grigory Pishchulov, João Quariguasi Frota Neto

For critical products, blockchain technology presents a multifaceted impact on sustainability, encompassing both positive and negative effects. Positively, blockchain enhances transparency and traceability, boosting consumer trust, which significantly affects both demand and return volume in a closed-loop supply chain (CLSC). Higher return volume prevents the introduction of waste into the environment, contributing to sustainability. On the other hand, blockchain is energy-intensive and requires substantial resources for its infrastructure, producing a significant electronic waste. Balancing blockchain's dual impact on sustainability over time is crucial for leveraging its benefits while mitigating its

environmental impact. Using a differential game model, this research delves into the transformative potential of blockchain technology within a CLSC, specifically examining its dynamic effects on consumer trust, sustainability, and profitability. By comparing collaborative and non-collaborative settings, we uncover how blockchain can enhance operational efficiency and environmental benefits. Our findings reveal that while blockchain potentially boosts profitability and sustainability in both settings, the collaborative approach amplifies these advantages through better coordination and resource sharing. The study also highlights blockchain's dual environmental impact, balancing its positive effects on transparency and efficiency against its high energy consumption and potential environmental damage. Through a comprehensive analysis of key parameters such as environmental damage, consumer trust, and blockchain investment, we provide strategic insights for maximizing blockchain benefits. We also validate the results on the case of a pharmaceutical supply chain. Policy implications emphasize the importance of fostering collaboration and supportive frameworks to leverage blockchain's full potential.

3. Can Ethical Labour Practices in AI Supply Chains Be Credibly Signalled?

(14:30-14:55)

Dewang Pagare and Indranil Biswas

The rapid diffusion of generative AI has intensified reliance on global data-labelling supply chains, where dispersed crowdworkers perform essential, but often invisible, human data labour. Despite growing pressure for responsible AI, AI model developers face severe information asymmetries. They cannot readily distinguish between crowdwork platforms that genuinely uphold ethical labour standards and those that rely on poverty wages, opaque contracts, and weak protections. This study investigates whether ethical labour practices in AI data-labelling supply chains can be credibly signalled through third party audits and certifications. We develop an analytical model of the interaction between a crowdwork platform (which may be responsible or exploitative) and an AI model developer deciding whether to contract with it. Platforms strategically choose the quality of audit and certification, trading off cost, scrutiny, and reputational value. The analysis characterises conditions under which responsible platforms invest in rigorous, credible audits and can separate themselves from exploitative competitors, and when cheap, low quality audits lead to pooling and greenwashing. We derive managerial insights for AI intensive operations and supply chain managers on designing sourcing policies, contract terms, and audit regimes that support fair wages, worker protections, and trustworthy transparency.

4. From Disruption to Resilience: The Double-Edged Role of Digital Technologies in Agri-Food Supply Chain Resilience (15:00-15:25)

Colette Nsofor, Bhakti Stephen Onggo, Yu (Jack) Gong

The increasing and more frequent exposure of the agri-food supply chain to severe disruptions has exposed its vulnerabilities and intensified global concerns about food security and the chain's continuity. Although digital technologies (DTECH), such as Internet of Things, Blockchain, Artificial Intelligence, and Big Data Analytics, are often advocated as promising tools for strengthening agri-food supply chain resilience (AFSCRes), existing literature remains narrowly focused, fragmented and incomplete in providing an understanding of DTECH and AFSCRes dynamics, necessitating an important but overlooked investigation. This research focuses on developing and empirically validating a comprehensive framework, underpinned by the complex adaptive systems lens, examining how disruptions, DTECH, technology-induced issues, and institutional forces integrate to shape resilience outcomes in the agri-food supply chain. Drawing on a systematic review, a novel conceptual model was developed, along with associated hypotheses. A survey research methodology was used to gather original quantitative data from 624 agri-food practitioners to empirically validate the model, using robust partial least squares structural equation modelling and multi-group analysis techniques. The findings confirm the notion that crises are opportunities, suggesting that disruptions serve as positive triggers for using DTECH in the agri-food supply chain. The results also revealed that although DTECH contributes to enhancing AFSCRes, it can simultaneously introduce unintended consequences in the form of technology-induced issues that can compromise AFSCRes. It also shows that DTECH reduces AFSCRes through the mechanism of technology-induced issues, revealing important trade-offs. Moreover, it was found that in a broader environment characterised by strong institutional forces, such as data governance and government support, the emergence of technology-induced issues can be stabilised, thus amplifying the net AFSCRes gains of DTECH. Furthermore, the findings suggest that DTECH-driven AFSCRes outcomes vary across the upstream, midstream, and downstream segments of the agri-food supply chain. This research offers insights for researchers, industry practitioners, and policymakers.