Durham University
Business School

PhD Studentships for Academic Year 2026-27

Centre for Strategy, Technological Innovation, and Operations (CSTIO)

About the Research Centre

The Centre for Strategy, Technological Innovation, and Operations (CSTIO) is requesting applications for PhD scholarships with students expecting to start the programme in the academic year 2026/2027.

To apply for a scholarship, applicants should choose one of the topics listed below and described in the next pages of this document, contact the associated supervisor(s), and work towards a research proposal.

List of proposed research topics for the programme starting in 2026/2027:

1. The Impact of Cybersecurity Incidents on Cybersecurity Professionals' Wellbeing
2. The Future of Prescriptive Analytics
3. Real Options and Servitization on Business-to-Business Markets: Exploring the Intersection of Strategic Flexibility and Buyer-Supplier Dynamics
4. Corporate Governance for a Better World
5. Real Options in Strategy, Innovation, or Global Operations
6. Agent Behaviour in Call Centres
7. The Impact of Data Factor Development Levels on Corporate Investment Behaviour
8. Technological Innovation and Managerial Strategies for a Just Net-Zero Transition: A Sectoral Approach
9. Personalised Assortment Planning
10. Integrated Planning for Healthcare Operation Management
11. Political Risk in Businesses and the Financial Markets
12. Geopolitical Strategy Shifts, Decoupling, and Firm Adaptation

Find out more at: Centre for Strategy, Technological Innovation and Operations - Durham University Business School

Topic 1

Title of Proposed Research Topic:

The Impact of Cybersecurity Incidents on Cybersecurity Professionals' Wellbeing

Potential Supervisors:

Professor Efpraxia Zamani

Professor Mariann Hardey

Description of Possible Research Topic:

Although technical solutions can help mitigate a variety of cyber harms, they are not capable of discovering and averting new zero-day attacks and advanced persistent threats. The role cybersecurity professionals play in adapting technical solutions, hardening systems, and distinguishing between malicious and legitimate cyber behaviours is crucial to mitigating cyber risks (Whitty et al., 2024).

However, stress, burnout, cybersecurity fatigue, a shortage in cybersecurity professionals, the increasing threat landscape and the sophistication of modern cyber-attacks, data breaches and ransomware attacks, coupled with increased regulatory demands, dependence on advanced technologies and the evolving business environment have led to significant negative implications in terms of wellbeing and job satisfaction among cybersecurity professionals. These have also led to non-compliance with organisational policies and procedures in cybersecurity, which is a major risk that can be exploited by cybercriminals, the latter being known to exploit human weaknesses to breach sensitive and critical information and infrastructure (Nobles, 2022; Reeves et al., 2023).

The goal of this research then is to examine emerging workplace practices affecting cybersecurity professionals in the United Kingdom, with a focus on job satisfaction and wellbeing.

The research approach is envisaged to be largely qualitative, but there is scope to adopt different methods. The objective of the project is to focus on the human element of the industry, probe into what wellbeing and job satisfaction mean for cybersecurity professionals, as well as to examine the coping mechanisms they tend to adopt within the context of surviving as well as thriving in their careers.

Key References:

Whitty, M.T., Moustafa, N., & Grobler, M. (2024). Cybersecurity When Working from Home During COVID-19: Considering the Human Factors. *Journal of Cybersecurity*, 1–11.

Nobles, C. (2022). Stress, Burnout and Security Fatigue in Cybersecurity: A Human Factors Problem. *Holistica Journal of Business and Public Administration*, 13(1), 49–72.

Reeves, A., Pattinson, M., Butavicius, M. (2023). Is Your CISO Burnt Out Yet? Examining Demographic Differences in Workplace Burnout Amongst Cyber Security Professionals. In Furnell, S., Clarke, N. (eds) *Human Aspects of Information Security and Assurance*. IFIP Advances in Information and Communication Technology, Springer, 674, 225–236.

Topic 2

Title of Proposed Research Topic:

The Future of Prescriptive Analytics

Potential Supervisors:

Dr Gar Goei Loke

Professor Stavros Zenios

Description of Possible Research Topic:

I am keen to work with students who are interested in inventing the next wave of prescriptive analytics methods beyond existing neural network infrastructures, by combining concepts and approaches in Statistics, Optimization and Machine Learning. This PhD journey will embark on both (i) a theoretical exploration of methodologies to examine how emergent ideas in statistics and existing notions in machine learning can be incorporated into (both static and online) data-driven optimization and decision-making, and (ii) a critical application of such methodologies to emerging real-world problems such as personalized medicine in healthcare, emerging business models in platform-based retail operations or sustainable operations in supply chains or energy, or on political risk in diverse business settings. Students will have the freedom to choose a more theoretical or application-based orientation for their thesis, and should they pursue the latter, will have the opportunity to propose their own topics.
Preferred background: Students with backgrounds in mathematics, statistics and / or data science are strongly preferred. Students with backgrounds in computing, engineering, econometrics, quantitative finance are also preferred. Students with backgrounds in related STEM fields (e.g. computational biology) or social science or business with specializations or minors in quantitative areas (such as quantitative economics or business analytics) can consider applying. Students with no quantitative experience will not be considered. Coding experience in languages such

as Python, R, Matlab, Julia or similar languages are strongly preferred, while experience in languages such as C/C++, SQL, Java or similar
can consider. Students with an inclination to pursue research careers after their PhDs are also strongly preferred.
Expectations: Students will receive intense one-to-one technical training and experiential learning through research with me in areas of (graduate) mathematical optimization, stochastic processes and statistics, and will have the chance to collaborate with world-class leading researchers in the area through my networks. Expected graduation requirements would be at least 3 manuscripts with a reasonable chance of publication in global top management and OR journals.
If interested: I can provide contacts to my graduated and current students who could give a better and more personal picture of the process of collaborating with me. Students are highly recommended to read my publications to get a feel of what they would be getting themselves into. If interested, students should contact me as soon as possible.

Key References:

Loke, G. G., Taozeng, Z., & Ruiting, Z. (2023). Optimize-via-Predict: Realizing Out-of-sample Optimality in Data-driven Optimization. Pre-print: https://papers.ssrn.com/sol3/papers.cfm?abstract_id=4561006

Lotfi, S., Pagliardi, G., Paparoditis, E., & Zenios, S. A. (2025). Hedging Political Risk in International Equity Portfolios. *European Journal of Operational Research*, 322, 629-646. https://www.sciencedirect.com/science/article/pii/S0377221724007938

Topic 3

Title of Proposed Research Topic:

Real Options and Servitization on Business-to-Business Markets: Exploring the Intersection of Strategic Flexibility and Buyer-Supplier Dynamics

Potential Supervisors:

Professor Zsofia Toth

Professor Lenos Trigeorgis

Description of Possible Research Topic:

A real option is the right to make, adjust or abandon choices that are available to the managers of a company, typically concerning business projects or investment opportunities, often relevant for innovation purposes. One of these potential

innovation settings is servitization. Servitization is a transformational process whereby a company shifts from a product-centric to a service-centric business model through offering tightly knot product-service bundles instead of only products. For example, instead of a company just selling an excavation machinery (which may be rarely needed by a potential buyer) it can also offer leasing the equipment for a short period as a service, including maintenance coverage. Real options theory provides a framework for evaluating and managing flexibility in strategic decision-making, particularly in uncertain environments, which is relevant for servitization and other innovative settings.

This PhD project aims to investigate the application of real options theory in the context of servitization, focusing on how companies can leverage real options to navigate the challenges and opportunities presented by this business model transformation from (only) products to synergistic product-service offerings. The research will explore: (1) The types of real options most relevant to servitization strategies; (2) The valuation and implementation of these options in a servitization decision-making context; (3) The impact of real options thinking on innovation and the competitive advantage in servitized business models.

The study will integrate two primary theoretical perspectives, namely theoretical discussions on servitization, drawing on business model innovation, value creation, and customer-centric approaches, and real options theory, focusing on managerial flexibility and strategic decision-making under uncertainty in the context of servitization. The project may draw on a mixed methods approach.

A few research questions (that can be further specified/developed by the PhD student):

-How can real options theory be applied to evaluate and manage the risks and opportunities associated with servitization strategies?

-What types of real options are most valuable in the context of servitization? Are there any major differences across traditional industrial sectors in this respect?

-How does the incorporation of real options thinking influence the success and innovation outcomes of servitization initiatives?

-What are the key challenges and benefits in implementing real options approaches in servitization-related decision-making?

Key References:

Trigeorgis, L., & Reuer, J. J. (2017). Real Options Theory in Strategic Management. *Strategic Management Journal*, 38(1), 42-63.

Trigeorgis, L., & Tsekrekos, A. E. (2018). Real Options in Operations Research: A Review. *European Journal of Operational Research*, 270(1), 1-24.

Raddats, C., Kowalkowski, C., Benedettini, O., Burton, J., & Gebauer, H. (2019). Servitization: A Contemporary Thematic Review of Four Major Research Streams. *Industrial Marketing Management*, 83, 207-223.

Topic 4

Title of Proposed Research Topic:

Corporate Governance for a Better World

Potential Supervisors:

Professor Lenos Trigeorgis

Professor Spyros Angelopoulos

Description of Possible Research Topic:

The concept of "planetary boundaries" represents the safe operating limits for human activity within Earth's ecological thresholds, emphasizing a sustainable balance between progress and environmental stewardship (Rockström et al. 2009). With climate change, biodiversity loss, pollution, and other environmental threats reaching critical levels, corporations play an increasingly vital role in maintaining the ecological balance. This research explores how corporate governance structures, strategies, and policies can actively contribute to operating within these planetary boundaries.

The intersection of corporate governance and planetary boundaries is increasingly significant as businesses operate within a rapidly evolving socio-environmental landscape. Crossing these boundaries, such as those related to climate change, biodiversity, and freshwater use, could lead to irreversible environmental damage. Given the scale of corporate impact on these thresholds, corporations are uniquely positioned to help mitigate ecological degradation through responsible governance practices. However, current corporate governance models often fall short in addressing environmental concerns, frequently prioritizing shareholder value over sustainability (Whiteman, Walker, & Perego, 2013).

Corporate governance mechanisms that explicitly align with sustainability goals—such as transparent environmental reporting, proactive resource management, and equitable stakeholder engagement—are essential in aligning corporate actions with ecological sustainability (Sjåfjell, 2020). Recent literature highlights the pivotal role of corporate boards and executive leadership in embedding ecological limits into strategic decision-making. For instance, Enciso-Alfaro (2024) examines how gender-diverse boards have contributed to circular economy initiatives that respect ecological thresholds, underscoring the role of board composition in governance-driven sustainability.

Yet, governance has not yet been adapted to integrate the scientific rigor of the planetary boundaries framework, which calls for actionable and enforceable corporate policies that address these limits. For instance, Edwards et al. (2021) suggest a transformative approach in management education that prioritizes earth system science within business strategy, illustrating a growing awareness but also a gap in governance practice.

The proposed research aims to develop the thery of adoption and use by corporate governance frameworks through the lens of planetary boundaries, providing a systematic understanding of how governance can function within Earth's ecological thresholds. Developing a governance model that emphasizes sustainability alongside corporate growth goals could serve as a blueprint for long-term ecological balance and economic resilience.

Key References:

Whiteman, G., Walker, B., & Perego, P. (2013). Planetary Boundaries: Ecological Foundations for Corporate Sustainability. *Journal of Management Studies*.

Sjåfjell, B. (2020). Sustainable Value Creation within Planetary Boundaries—Reforming Corporate Purpose and Duties of the Corporate Board. *Sustainability*.

Enciso-Alfaro, S. Y. (2024). Do Boards Care About Planetary Boundaries? A Gender Perspective on Circular Economy Disclosures. *Business Strategy and the Environment.*

Sjåfjell, B., & Taylor, M. B. (2015). Planetary Boundaries and Company Law: Towards a Regulatory Ecology of Corporate Sustainability. *University of Oslo Faculty of Law Research*.

Edwards, M. G., Alcaraz, J. M., & Cornell, S. E. (2021). Management Education and Earth System Science: Transformation as if Planetary Boundaries Mattered. *Business & Society*.

Topic 5

Title of Proposed Research Topic:

Real Options in Strategy, Innovation, or Global Operations

Potential Supervisors:

Professor Lenos Trigeorgis

Professor Stewart Miller

Description of Possible Research Topic:

This proposal is flexible aimed to accommodate any thesis project involving the use of real options theory in a context involving firm strategy, innovation activities, or global operations. A real option is the right (but not the obligation) to invest in a tangible real asset (e.g., a manufacturing factory, a block of potential oil and gas reserves) or intangible asset (e.g., a patent, lease, brand), conferring valuable flexibility to adjust future decisions to take advantage of upside opportunity while limiting downside losses. Real options theory involves the evaluation and management of investments involving real options under uncertainty (e.g., to delay or stage investment, contract, grow or expand operations, switch or redeploy resources in an MNC network or supply chain etc.). Any context involving strategic decisions, innovation activity, or managing global operations in an uncertain environment will be considered. Potential research topics include:

- Real options in innovation and entrepreneurial strategy
- Real options in digital transformation
- Real options in digital-based 'reverse innovation' whereby small firms in developing countries can obtain a competitive technological advantage using better knowledge of local customers in the periphery to develop more cost-efficient and/or superior innovative products that they can subsequently sell in the developed world using standard interfaces of digital platforms and ecosystems (relates to location choice of innovation)
- Real options to acquire & exploit data/information in firm's international involvement decisions, e.g., by an owner of a digital platform like Amazon in choosing in which product spaces to compete in (potentially against complementors on its own platform) or by IBM gathering data and deploying AI and other digital technologies in Africa for later redeployment in the Western world
- Real options to support resilience and sustainability in the global supply chain
- Real options in a hybrid form of global operations (e.g., MNCs with physical & virtual operations; with exit, switch and re-entry options; a platform owner like Amazon being both a marketplace and a retailer)
- Real options and co-opetition (sometimes competing and other times collaborating)

Key References:

Aabo, T., Pantzalis, C., Park, J. C., Trigeorgis, L., & Wulff J. N. (2024). CEO Personality Traits, Strategic Flexibility, and Firm Dynamics. *Journal of Corporate Finance*, 102524.

Avanzi, B., Bicer, I., de Treville, S., & Trigeorgis, L. (2013). Real Options at the Interface of Finance and Operations: Exploiting Embedded Supply Chain Real Options to Gain Competitiveness. *European Journal of Finance*, 19(7-8), 760-778.

Chevalier-Roignant, B., Flath, C., Huchzermeier, A., & Trigeorgis, L. (2011). Strategic Investment under Uncertainty. *European Journal of Operational Research* 215(3), 639-650.

Chi, T., Li, J., Trigeorgis, L., & Tsekrekos, A. (2019). Real Options in International Business. *Journal of International Business Studies* 50(4), 525-553.

Choi, J. J., Yu, M., Kotabe, M., Trigeorgis, L., & Zhang, X. T. (2018). Flexibility as Firm Value Driver: Evidence from Offshore Outsourcing. *Global Strategy Journal,* 8(2), 351-376.

Ioulianou, S., Leiblein, M., & Trigeorgis, L. (2021). Multinationality, Portfolio Diversification, and Asymmetric MNE Performance: The Role of Real Options Awareness. *Journal of International Business Studies,* 52, 388-408.

Kulatilaka, N., & Trigeorgis, L. (1994). The General Flexibility to Switch: Real Options Revisited. *International Journal of Finance,* 6(2), 778-796.

Panayi, S., & Trigeorgis, L. (1998). Multi-stage Real Options: The Cases of Information Technology Infrastructure and International Bank Expansion. *Quarterly Review of Economics and Finance*, 38, 675-692.

Ragozzino, R., Reuer, J., & Trigeorgis, L. (2016). Real Options in Strategy and Finance: Current Gaps and Future Linkages. *Academy of Management Perspectives*, 30(4), 428-440.

de Treville, S., & Trigeorgis, L. (2010). It May be Cheaper to Manufacture at Home. *Harvard Business Review*, 84-87.

Trigeorgis, L. (1993). Real Options and Interactions with Financial Flexibility. *Financial Management*, 22, 202-224.

Trigeorgis, L., Baldi, F., & Makadok, R. (2021). Compete, Cooperate, or Both? Integrating the Demand Side into Patent Deployment Strategies for the Commercialization and Licensing of Technology. *Academy of Management Review,* 47(1), 31-58. https://doi.org/10.5465/amr.2018.0119

Trigeorgis, L., & Reuer, J. (2017). Real Options Theory in Strategic Management. *Strategic Management Journal*, 38(1), 42-63.

Trigeorgis, L., & Miller, S. R. (2025). Real Option Portfolios and the Theory of the Multinational Enterprise: Understanding Modes of International Involvement in the

Digital Economy. *R&R Journal of International Business Studies*. https://doi.org/10.1057/s41267-025-00806-x

Topic 6

Title of Proposed Research Topic:

Agent Behaviour in Call Centres

Potential Supervisors:

Professor Neil Walton

Dr Riccardo Mogre

Description of Possible Research Topic:

Staffing considerations in call centres are crucial, as they impact both the efficiency and quality of service delivery, while also supporting agents' well-being by reducing stress and enhancing work-life balance. For accurate staffing models, it is essential to account for agent behaviour, including patterns such as break times and work habits towards the end of shifts. However, current research on agent behaviour in call centres is limited; most behavioural studies focus on caller dynamics, with notable contributions to agent behaviour by Takagi and Taguchi (2014) and Azriel et al. (2019). This proposed PhD aims to advance call centre staffing models through a queueing theory framework that incorporates agent behaviours to optimise staffing decisions.

Key References:

Azriel, D., Feigin, P.D., & Mandelbaum, A. (2019). A Data-based Model of Servers in Queueing Networks. *Management Science*, 65(10), 4607-4635.

Takagi, H., & Taguchi, Y. (2014). Analysis of a Queueing Model for a Call Centre with Impatient Customers and After-call Work. *International Journal of Pure and Applied Mathematics*, 90(2), 205-237.

Topic 7

Title of Proposed Research Topic:

The Impact of Data Factor Development Levels on Corporate Investment Behaviour

Potential Supervisors:

Professor Lenos Trigeorgis

Dr Xinwei Shi

Description of Possible Research Topic:

With the advancement of global digital transformation, the world is experiencing explosive growth in data volume. The use of data also deepened as analytical technologies and platforms developed. Data is gradually capitalised and circulated as a production factor, forming a data-factor market. Corporate investment behaviour changed accordingly. The strategies rely more on data analysis than experience and show a stronger tendency toward data and digital transformation investments. To quantify the development level of data factors, we use Structural Equation Modeling (SEM) as the model, exploring the impacts of variables such as the development level of the data factor market, the completeness of data infrastructure, and the policy environment for data circulation on different types of corporate investment behaviour. The data comes from various research reports and databases in China. This research aims to systematically analyse the impact mechanism of data factor market development on corporate investment decisions, enriching the theoretical framework of the relationship between data factors and corporate behaviour. Additionally, it provides empirical support for formulating domestic data factor governance policies and corporate investment strategies, promoting corporate transformation and upgrading in the context of the digital economy.

Key References:

Gandomi, A. H., & Haider, M. (2015). Beyond the Hype. *International Journal of Information Management*. https://doi.org/10.1016/j.ijinfomgt.2014.10.007

Bharadwaj, A. (2000). A Resource-based Perspective on Information Technology Capability and Firm Performance: An Empirical Investigation. *Management Information Systems Quarterly*. https://doi.org/10.2307/3250983

Ittner, C. D., & Larcker, D. F. (2003). Coming Up Short on Nonfinancial Performance Measurement. *Harvard Business Review*.

Teece, D. J. (2007). Explicating Dynamic Capabilities: The Nature and Microfoundations of (Sustainable) Enterprise Performance. *Strategic Management Journal.* https://doi.org/10.1002/smj.640

Teece, D. J., Pisano, G. P., & Shuen, A. (1997). Dynamic Capabilities and Strategic Management. *Strategic Management Journal.* https://doi.org/10.1002/(sici)1097-0266(199708)18:7<509::aid-smj882>3.0.co;2-z

Chen, H., Chiang, R. H. L., Storey, V. C. (2012). Business Intelligence and Analytics: from Big Data to Big Impact. *Management Information Systems Quarterly*. https://doi.org/10.2307/41703503

Manyika, J. (2011). Big Data: The Next Frontier for Innovation, Competition, and Productivity.

Eisenhardt, K. M., & Martin, J. A. (2000). Dynamic Capabilities, What Are They? *Strategic Management Journal*. https://doi.org/20050126074651

Wade, M., & Hulland, J. (2004). Review: The Resource-based View and Information Systems Research: Review, Extension, and Suggestions for Future Research. *Management Information Systems Quarterly*. https://doi.org/10.2307/25148626

Wamba, S. F., Gunasekaran, A., Akter, S., Ren, S. J., Dubey, R., & Childe, S. J. (2017). Big Data Analytics and Firm Performance: Effects of Dynamic Capabilities. *Journal of Business Research*. https://doi.org/10.1016/j.jbusres.2016.08.009

Mithas, S., Ramasubbu, N., & Sambamurthy, V. (2011). How Information Management Capability Influences Firm Performance. *Management Information Systems Quarterly*. https://doi.org/10.2307/23043496

Sivarajah, U., Kamal, M. M., Irani, Z., & Weerakkody, V. (2017). Critical Analysis of Big Data Challenges and Analytical Methods. *Journal of Business Research*. https://doi.org/10.1016/j.jbusres.2016.08.001

Cohen, W. M., & Levinthal, D. A. (1990). Measurement of Potential Absorption Capacity in Colombia's Innovative Companies. https://doi.org/10.2307/2393553

Wang, Y., Kung, L.-A., & Byrd, T. A. (2018). Big Data Analytics: Understanding its Capabilities and Potential Benefits for Healthcare Organizations. *Technological Forecasting and Social Change*. https://doi.org/10.1016/j.techfore.2015.12.019

Topic 8

Title of Proposed Research Topic:

Technological Innovation and Managerial Strategies for a Just Net-Zero Transition: A Sectoral Approach

Potential Supervisors:

Professor Rudolf Sinkovics

Professor Stavros Zenios

Description of Possible Research Topic:

This project examines the role of advanced technologies (Ahi et al. 2022) in supporting the transition to a net-zero economy in economic regions. The focus is on key sectors, major industry leaders, and the involvement of small and medium enterprises (SMEs). The project will analyse the deployment of technologies like carbon capture and storage (CCS), renewable energy integration, digital monitoring systems, and AI-driven efficiency solutions (see e.g., Dubey and Arora 2022). The ambition is to understand whether and how such innovations can facilitate carbon reduction while promoting an equitable transition in line with the UN-SDGs, for local communities and businesses in the region (c.f. Andrews, Sinkovics, and Sinkovics 2023; Cahill and Allen 2020).

The project combines sector-specific case studies and stakeholder interviews, aiming to identify effective managerial strategies that leverage these technologies to overcome regional and sectoral challenges. The project will also explore how large industry leaders can act as catalysts for technological adoption among SMEs, creating an understanding of progress towards net-zero that includes knowledge-sharing and resource pooling. By highlighting both the opportunities and constraints of advanced technology for different businesses within selected sectors, this study will provide actionable recommendations to policymakers, corporate leaders, and regional stakeholders for building an inclusive and sustainable path to net-zero in the Northeast (Robins et al. 2019).

Key References:

Ahi, A. A., Sinkovics, N., Shildibekov, Y., Sinkovics, R. R., & Mehandjiev, N. (2022). Advanced Technologies and International Business: A Multidisciplinary Analysis of the Literature. *International Business Review*, 31(4), 101967. https://doi.org/10.1016/j.ibusrev.2021.101967

Andrews, K., Sinkovics, N., & Sinkovics, R. R. (2023). Tensions on the Road Toward Just Transitions in the Latin American Coffee Value Chain. In Van Tulder, R., Giuliani, E., & Álvarez, I. (Eds.). *International Business and Sustainable Development Goals.* Progress in International Business Research, 17, 309-323. https://doi.org/10.1108/S1745-886220230000017016

Cahill, B., & Allen, M. M. (2020). Just Transition Concepts and Relevance for Climate Action. Washington, DC: Just Transition Initiative. https://www.climateinvestmentfunds.org/sites/cif_enc/files/knowledge-documents/justtransition_final.pdf.

Dubey, A., & Arora, A. (2022). Advancements in Carbon Capture Technologies: A Review. *Journal of Cleaner Production*, 373, 133932. https://doi.org/10.1016/j.jclepro.2022.133932

Robins, N., Gouldson, A., Irwin, W., & Sudmant, A. (2019). Investing in a Just Transition in the UK: How Investors Can Integrate Social Impact and Place-based Financing into Climate Strategies. London: Grantham Research Institute on Climate Change and the Environment, London School of Economics and Political Science. https://www.lse.ac.uk/granthaminstitute/publication/investing-in-a-just-transition-in-the-uk/

Topic 9

Title of Proposed Research Topic:

Personalised Assortment Planning

Potential Supervisors:

Professor Nalan Gulpinar

Description of Possible Research Topic:

Balancing supply and demand uncertainties is a mission impossible for any supply chain. Especially for retailers using an online shopping channel, offering the most preferable products at acceptable price for individual customers is a challenging problem and this requires a real-time decision-making process with novel and efficient solution approaches. Most importantly, changing customer choices and expected future demand within different market conditions need to be taken into account when making decisions. This project aims to develop real-time decision-making approaches for retail revenue management and dynamic pricing problems under uncertain customer demand. Machine learning approaches will be used for the assortment planning of personalised products by taking into account customer preferences. Due to dynamic and stochastic nature of the underlying real-life problem, stochastic dynamic programming models will be developed and distributionally robust optimisation will be considered to model the underlying demand uncertainty. It is crucial to determine pricing strategies efficiently given in a real-life setting. However, the existing solution approaches are not applicable due to curse of dimensionality. Novel solution approaches based on approximate dynamic programming and decomposition methods need to be developed. The PhD project will focus on i) development of novel models for joint assortment optimisation and dynamic pricing problem using stochastic dynamic programming, ii) design of solution approach based on approximate methods, iii) implementation and evaluation of the proposed methods using real data (collected from an online shopping platform) and comparison with traditional approaches. The modelling and solution framework proposed in this PhD will be developed in collaboration with industrial partners (e-commerce company/retailer). A recommendation system will be

designed, and the optimal strategies will be evaluated under various customer acceptance rules. Working codes for the underlying retail optimisation and customer choice models and research papers presenting numerical results obtained by a real data set. Students are required to have programming skills and desire to work on real life decision-making problems.

Key References:

Aydin, G., & Ziya, S. (2009). Personalized Dynamic Pricing of Limited Inventories. Operations Research, 57(6), 1523–1531. https://doi.org/10.1287/opre.1090.0701

Bhatia, N., Gulpinar, N., & Aydin, N. (2020) Dynamic Production-Pricing Strategies for Multi-generation Products under Uncertainty. *International Journal of Production Economics*, 230, 107851.

Gulpinar, N., Strauss, A., & Zheng, Y. (2021). Dynamic Pricing of Flexible Timeslots for Attended Home Delivery. *European Journal of Operational Research*, 294(3), 1022-1041.

Miao, S., & Chao, X. (2020). Dynamic Joint Assortment and Pricing Optimization with Demand Learning. *Manufacturing & Service Operations Management*, 23(2), 525-545.

Topic 10

Title of Proposed Research Topic:

Integrated Planning for Healthcare Operation Management

Potential Supervisors:

Professor Nalan Gulpinar

Description of Possible Research Topic:

Increasing data availability and streamlining of inpatient care have demonstrated the need and possibility to successfully link decisions on different resources (Rachuba et al. 2022). This leads to an integrated approach that allows joining complex decision-making processes efficiently. A joint decision-making provides benefits in comparison to decision-making in isolation; especially capacity decisions made in isolation may not be feasible for the integrated whole system. As far as the hospital management is concerned, the optimal, yet non-integrated, decisions do not guarantee a good utilization of immediately related resources such as shared hospital wards, personalized rooms and multi-skilled nursing staff. This project aims to develop novel modelling and solving approaches for integrated decision-making

problems that the hospital management faces. Synchronising those independent operational activities as part of a holistic approach is a challenging task, but crucial for the efficient utilisation of hospital resources. The modelling and solution framework proposed in this PhD will be developed in collaboration with industrial partners (such as NHS Trust). Working codes for the underlying integrated healthcare operations management and research papers presenting numerical results obtained by a real data set. Students are required to have programming skills and desire to work on real life decision-making problems.

Key References:

Brandt, T., Klein, T. L., Reuter-Oppermann, M., Schäfer, F., Thielen, C., van de Vrugt, M., & Viana, J. (2023). Integrated Patient-to-room and Nurse-to patient Assignment in Hospital Wards. *ArXiv*, 2309.10739.

Rachuba S., Reuter-Oppermann M., & Thielen C. (2023). Integrated Planning in Hospitals: A Review. *ArXiv*, 2307.05258v1.

Rachuba, S., Imhoff L., & Werners, B. (2022). Tactical Blueprints for Surgical Weeks - An Integrated Approach for Operating Rooms and Intensive Care Units. *European Journal of Operational Research,* 298, 243–260.

Rachuba, S., & Gulpinar, N. (2023). An Integrated Approach for Flexible Restructuring of Inpatient Wards. SSRN 4227808.

Topic 11

Title of Proposed Research Topic:

Political Risk in Businesses and the Financial Markets

Potential Supervisors:

Professor Stavros Zenios

Dr Chang Dong

Description of Possible Research Topic:

Political risk is among the top three risks in the World Economic Forum's recent annual risk report. It is a known determinant of market returns, with significant cross-country spillover effects, and a recently uncovered priced global political risk P-factor. However, it is a complex, multifaceted concept with no consensus on how to measure it. The ambiguity surrounding political risk prompted the development of rating proxies using expert judgments, surveys, or news analytics. Several country

ratings from major international institutions are widely used and often cited. We have the Ifo World survey of experts, and experts' judgments from the World Bank and International Country Risk Guide. We also have news analytics indices for geopolitical risk and economic policy uncertainty published in flagship economics journals.

There are opportunities to pursue a PhD in developing methods to account for political risk across a diversity of business settings. Research can be empirical, data-driven, or model-based, and, ideally, it will be a combination of both. Students will receive intense one-on-one personalized training from either one or both of the potential supervisors, depending on the direction they wish to pursue. They will work closely with the supervisors to gain research experience, formulate the research questions, develop appropriate methodologies, and carry out analyses. Potential topics include but are not limited to, the following: (i) The effects of political risk on financial market pricing and sovereign debt management, (ii) Strategies for hedging political risk in international portfolios, (iii) The transmission of political risk through the global supply, (iv) Asset and liability management of globally active insurance companies in the presence of political risk. Of particular interest is the ambiguity surrounding the complex notion of political risk, and the challenge of reconciling the various proxies and developing strategies that robustly hedge it.

Successful candidates should ideally hold a MSc-level degree with strong quantitative skills, such as operational research, financial engineering, and data sciences and have a strong aptitude for computer programming and data analysis. The expectation is to complete three high-quality working papers for publication in leading international journals.

Students will also have an opportunity to engage with an international network of collaborators, to present their work at international conferences or symposia.

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Topic 12

Title of Proposed Research Topic:

Geopolitical Strategy Shifts, Decoupling, and Firm Adaptation

Potential Supervisors:

Professor Rudolf Sinkovics

Professor Stavros Zenios

Description of Possible Research Topic:

Geopolitical tensions and the structural transformation of the global economy continue to create significant strategic challenges for firms. Processes of deglobalisation, decoupling, and the increasing use of trade, technology, and investment instruments for security purposes contribute to an environment that is volatile, uncertain, complex, and ambiguous (Eden, Hermann, and Miller 2021; Witt 2019; Witt et al. 2023). These developments influence how firms design supply chains, manage political and economic risk, and make investment and innovation decisions (Curran and Eckhardt 2021; Petricevic and Teece 2019; Sydow, Helfen, and Auschra 2021), and they shape how firms relate to national and international economic security frameworks such as the UK National Security and Investment Act (NSIA).

Until recently, the Biden–Harris National Security Strategy framed economic security using cooperative language that emphasised alliances, friend-shoring, resilient supply chains, and climate-related transitions (The White House 2021, 2022; Vivoda 2023).

The Trump National Security Strategy has now radically upended this. Trump II adopts a far more transactional and unilateral tone, expanding what it treats as a national security issue, and accompanying broader Trump-era practice that is

sceptical toward multilateral institutions and more confrontational in trade, technology, and climate governance (Bomberg 2021; Goldstein and Greenberg 2018; Luo 2022; Petricevic and Teece 2019; The White House 2025; Winston 2025). The friendly and alliance-centred framing that characterised the Biden–Harris era is therefore no longer the operative reference point. For UK firms, the key issue is not the fine detail of doctrinal texts, but how they navigate the heightened and more volatile security risk environment that follows from this shift, particularly as tensions over trade, technology, and critical minerals intensify (Curran and Eckhardt 2021; Sydow, Helfen, and Auschra 2021; Vivoda 2023; Witt et al. 2023; Witt et al. 2021).

This PhD project investigates how UK businesses interpret and respond to this more overtly securitised and unstable environment, and how they adapt their strategies, capabilities, and risk-management practices in a context of decoupling and economic security concerns. It builds directly on emerging work on deglobalization, decoupling, and Sino–US rivalry (Li et al. 2021; Witt 2019; Witt et al. 2023; Witt et al. 2021), as well as research that highlights the need to rethink global production networks, resilience, and stakeholder-oriented supply chain design in the face of crises (Curran and Eckhardt 2021; Sydow, Helfen, and Auschra 2021). It also connects to scholarship on firm-level networking and matching as mechanisms to mitigate barriers and maintain performance under rising nationalistic and protectionist pressures (Sinkovics, Kurt, and Sinkovics 2018).

Themes and methodological approaches

Candidates may pursue different thematic and methodological pathways within this project, depending on their interests and disciplinary background. Possible lines of inquiry include how firms interpret U.S. national security strategies and integrate them into geopolitical and economic risk assessments, how trade, technology, and investment instruments are understood as security tools, how transatlantic regulatory shifts shape firm decision-making, and which organisational capabilities support resilience and adaptation. Candidates may choose qualitative designs such as interviews and document analysis, quantitative approaches including surveys and structural equation modelling, or mixed methods that integrate both. The exact thematic focus, research questions, and methodological toolkit will be developed collaboratively with supervisors to reflect the strengths, interests, and ambitions of the PhD researcher.

Indicative research questions

Examples of potential research questions include, but are not limited to:

- How do UK businesses assess and respond to changes in U.S. national security strategy when these changes alter trade, investment, or technology relationships (The White House 2022, 2025)?
- In what ways does the shift from a cooperative to a more transactional and

unilateral approach in U.S. strategy influence firms' supply chain configurations, market strategies, and innovation activity (Luo 2022; Witt 2019; Witt et al. 2023)?

- How does the interaction between U.S. strategy, UK economic security frameworks, and global decoupling shape firm-level risk management practices and the design of global value chains (Curran and Eckhardt 2021; Petricevic and Teece 2019)?
- What types of capabilities and network strategies enable firms to navigate alternating geopolitical governance regimes and to sustain performance under rising geopolitical rivalry (Sinkovics, Kurt, and Sinkovics 2018; Witt et al. 2021)?

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