University of Technology Sydney (UTS) Business School

20th ANZAM Symposium 2023 Operations, Supply Chain and Services Management

Moira Scerri

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UTS BUSINESS SCHOOL,
University of Technology Sydney, Australia
Building 08, Level 08
14-28 Ultimo Road, ULTIMO, NSW 2007

The Symposium theme for 2023 is "Managing Turbulence and Performance in Operations & Supply Chains Through Digital Transformation."

Supply chain disruptions are inevitable and ever increasing. Ensuring supply chain continuity and managing performance during turbulent times is critical for organizations. Digital transformation of supply chain operations has become a powerful tool to enable supply chains to be resilient and sustainable against turbulence while maintaining performance. Numerous digital solutions such as information integration in supply chain, blockchain, big data analytics, artificial intelligence, robotics, the Internet of Things, and other advanced technologies enable organizations to identify problems and opportunities, seize opportunities, reconfigure resources and transform organizational capabilities and supply chain operations to manage and enhance performance. However, developing operational excellence and driving superior performance through digital transformation requires selecting the right strategies, implementing well thought out plans and building the right capabilities, all of which require sound organizational changes and leadership. This Symposium seeks to develop links between theory and practice, and will provide a platform for academics, industry partners, research students, and other practitioners to share novel empirical and modelling approaches for **Managing Turbulence and Performance in Operations & Supply Chains Through Digital Transformation.**

Message from Host Institution

Professor Carl Rhodes,
Dean UTS Business School
University of Technology Sydney, Australia

On behalf of UTS Business School it is our great pleasure to host the 20th ANZAM Operations, Supply Chain and Services Management Symposium (2023). Welcome! More than ever, today's businesses operate in a dynamic, and at times unpredictable environment. In this environment exploring how technology can shape global business is essential. Nowhere is this more true than in supply chains, where disruption and even chaos have become more widespread. This provides for many challenges and opportunities that scholars and experts need to contribute to addressing. As you discuss the many facets of supply chain and operations management throughout the symposium, I hope and trust that these major challenges will animate a challenging and productive dialogue that ultimately can help inform how advanced technologies enable resource reconfiguration, operational excellence and supply chain resilience.

Professor Bronwen Dalton,
Head of Management Department, UTS Business School, University of Technology Sydney, Australia

On behalf of the UTS Business School's Management Department I welcome you all to the 2023 ANZAM Operations, Supply Chain and Services Management Symposium. Congratulations to the local Organizing Committee for initiating and organizing such a stimulating program. By focusing on the management of entire value chains, supply chain management has gained increasing popularity in management research and in the teaching of global businesses. Particularly, through research in best practice in supply chain management and digitisation, we can find innovative ways to be responsive and resilient against challenges in the new era.

Welcome! ANZAM members to our campus, it is our pleasure to host you.

Key Note Speaker: Tava Olsen

Tava is an award-winning expert in operations and supply chain management, with a PhD from Stanford University and extensive experience publishing in Financial Times Top 50 journals.

Tava has edited several top academic journals including Operations Research (Area Editor for Operations and Supply Chain), Production and Operations Management (Senior Editor), Management Science (Associate Editor) and Manufacturing and Service Operations Management (Associate Editor).

Industry Speaker: Mr Pu Yun – Chief Technology Officer, Agree Technology Co., Ltd.

Pu Yun is an accomplished expert in technology leadership, with expertise in banking systems, financial technology, software engineering and system/system platform development. With a 20-year track record encompassing hundreds of IT and IS projects after graduating from Tsinghua University, he adeptly orchestrated, led, guided, managed and supervised ventures across diverse financial institutions, ranging from prominent large Chinese national banks to agile and dynamic small-scale financial institutions. Currently, Pu Yun is leading the research and development operations of Agree Technology, a FinTech end-to-end service provider (IDC accredited leader in banking channel solutions in China).

Presentation topic: 'Air Banking: A Practice of Innovative Digital Transformation, Operations and Service Management Excellence in Banking'

Industry Speaker Mr Jack Junjie Cai – Managing Partner of Consulting Service, Agree Technology Co., Ltd.

Jack Junjie Cai is a senior advisor in the topic of operation excellence, digital transformation and sustainable growth strategy. He works closely with executives from China, Hong Kong, Japan and Europe. Jack started his career as a strategy manager at a Fortune 500 company before he devoted himself to management consulting services at KPMG Consulting (NASDAQ/NYSE listed), Capgemini (CAC40 listed) and Shine Wing Group (IAB ranked 21). Jack is currently leading the strategy and transformation consulting practice of Agree Technology, a FinTech end-to-end service provider (IDC accredited leader in banking channel solutions in China).

Presentation topic: 'How Large Banks transform Service Model with Innovative Technology: A Case Study'

DAY 1: MONDAY 25 SEPTEMBER

TIME (AEST)	SESSION	LOCATION
9:00 – 9:30	Registration	CB08:08:003
9:30 – 10:30	Welcome, keynote and industry presentations	CB08:08:003
10:30 – 11:00	**MORNING TEA**	
11:00 – 11:10	Welcome from UTS Business School Prof Carl Rhodes, Dean, UTS Business School	CB08:08:003
11:10 – 12:30	**Paper presentation: Services management (5 papers)**	**Page 10 - 22**
Tayla Wilmot Alka Nand Amrik Sohal Neil Sigamoney	Data-driven healthcare supply chain transformation: A case study of Victoria's largest public health service	CB08:08:003
Lusheng Shao	Multiproduct Price Competition on a Retail Platform	CB08:08:003
Sachithra (Sachi) Patabendige	An investigation into Revenue Leakage Problem in the 3PL Industry sector in Australia	CB08:08:003
Mingliang Wu Moira Scerri Maruf Chowdhury	Service inclusion and Transformative Service Research: a new perspective on customer journey mapping for vulnerable people using residential aged care services	CB08:08:003
Hadwyn Ming Xi Chen, Gabrielle Peko Peter Shi	Envisioning the Next-Generation Banking Service System: A Model for Innovative Digital Transformation of Banking Front-End Operations and Services	CB08:08:003
12:30 – 13:30	**LUNCH BREAK**	
13:30 – 15:00	**Paper presentation: Supply chain risk management (5 papers)**	**Page 23 - 36**
William Ho Agus Wicaksana	Organizaional Resilience in the Perspective of Supply Chain Risk Management: A scholarly Network Analysis	CB08:08:003
Omar K. Hussain Ferry Jie Daniel Prajogo Ripon K. Chakrabortty	An Interpretative and Explainable Approach to Manage Supply Chain Risks	CB08:08:003
Li Guan Ripon K. Chakrabortty	An Intelligent Decision Support System for Defence Supply Chain Risk Management	CB08:08:003

Alireza Abbasi José M. Merigó		
Sean Arisian Kourosh Halat Ashkan Hafezalkotob Reenu Maskey	Mitigating supply chain cyber disruption via flexible cooperative contract	CB08:08:003
Jonas Shafondino Kamakela Devkumar Callychurn Dinesh Hurreram	Linking supply chain risk with emerging digital technologies within food and beverages manufacturing supply chain: An empirical quantitative study	Online (link will be provided)
15:00– 15:30	**AFTERNOON TEA**	
15:30 – 17:00	**Paper presentation: Sustainable supply chain (5 papers)**	**Page 37 – 50**
Quan Spring Zhou Paul Childerhouse	Incentivising Circular Supply Chain Participation	CB08:08:003
Mohammad Tarikul Islam Priyabrata Chowdhury	Social Upgrading in Global Value Chains: The Mediating Role of Supplier Capability and Moderating Role of Relational Governance	CB08:08:003
Anwara Happy Maruf Hossan Chowdhury Moira Scerri	Blockchain technology for Agri-food supply chain sustainability: A systematic literature review	CB08:08:003
Iftekhar Ahmed Robin Md Maruf Chowdhury Moira Scerri Melissa Edwards	Pathways to marine plastic waste recycling in Australia: a system dynamic approach	CB08:08:003
Reza Kiani Mavi Sobhan Arisian Ruxia Lyu Zhitang Li	The Role of Agricultural Biomass and Bioenergy in Decarbonising Supply Chains	CB08:08:003

DAY 1: MONDAY 25 SEPTEMBER

Parallel Session

13:30 – 15:00	**Paper presentation: Supply chain and logistics management (5 papers)**	**Pages 51 - 61**
Avisen Moonsamy Oliver Guidetti Mohiuddin Ahmed Bazlur Rashid	Cyber Insurance as a Risk Mitigation Strategy in Digital Supply Chains	CB08:08:004
Hadwyn Ming Xi Chen, Ye Han Dou Gabrielle Peko Peter Shi	Evaluating a Supply Chain Collaboration Framework through A Case Study	CB08:08:004
Yu Chen Liu Gabrielle Peko Hadwyn Ming Xi Chen	Requirements Management for Tailoring Digital Transformation in a Mental Health Environment	CB08:08:004
Shiyou Liu Sanjoy Paul Maruf Chowdhury Moira Scerri	Inter-organisational team identification and its influence on logistics outsourcing collaboration	CB08:08:004
Hansani Chathurika Dassanayake Sev Nagalingam Ke Xing	Barriers to sustainable operations: Insights from apparel manufacturing in developing countries	CB08:08:004

18:00 – 20:30	**CONFERENCE DINNER**	Lal Qila, Darling Harbour, 30 Lime St, Darling Harbour NSW 2000

DAY 2: TUESDAY 26 SEPTEMBER

TIME (AEST)	SESSION	LOCATION
9:00 – 10:30	**Paper presentation: Supply chain resilience (5 papers)**	**Pages 62 - 75**
Ferry Jie Kerry Brown Richard Oloruntoba James Earnest	Supply Chain Resilient Farming Systems	CB08:08:003
Agus Wicaksana William Ho Danny Samson Hugo Lam	Systemic influences of chief risk officer on operational resilience	CB08:08:003
David Herold	Supply chain responses to institutional turbulence: a resilience framework	CB08:08:003
Mesbahuddin Chowdhury Shahadat Hossain Maruf Hossan Chowdhury A.K.M. Shakil Mahmud Sajjad Hossain Eijaj Ahmed Khan	The role of managerial ties in building organizational resilience during pandemic time – A mediated moderated model	CB08:08:003
Priyam Bajpai Renu Agarwal Sanjoy Paul Chandrasekharan Rajendran	Role of Digital Transformation for Business Model Innovation in Transport logistics to enhance Resilience and promote Decarbonization	CB08:08:003
10:30 – 11:00	**MORNING TEA**	
11:00 – 12:30	**Paper presentation: Decision modelling and strategy development (5 papers)**	**Pages 76 - 85**
Indira Roy Lohithaksha M. Maiyar	Disruption-aware design for omnichannel fresh food supply chain	CB08:08:003
Xiaoyan Qian	Financing and Farm-gate Pricing Strategies for Agricultural Cooperatives with Cash-constrained Farmers	CB08:08:003
Towfique Rahman Sanjoy Kumar Paul Renu Agarwal Nagesh Shukla Firouzeh Taghikhah	Managing Panic-Buying Challenges in Supply Chains during Large-Scale Disruptions: An Integrated Approach	CB08:08:003
Jun Wu Meng Wang	Research on the evolution game of drug quality and safety supervision based on consumer	CB08:08:003

Lijuan Ding Qianqian Zhang Jiqin Ren Ernesto Santibanez Gonzalez	feedback mechanism and government punishment mechanism	
Shams Rahman	Looking Ahead by Looking Back – Gilmour's Contributions to Australian Operations Management	CB08:08:003
12:30– 13:30	**LUNCH BREAK**	
13:30 – 15:00	**Paper presentation: Supply chain management (4 papers)**	**Pages 86 - 100**
Ming Juan Ding Sujak Bakir Ferry Jie	Exploring the key factors affecting the supply chain resilience in the construction industry in Australia	CB08:08:003
Md Maruf Chowdhury Melissa Edwards	Environmental Impact Analysis of Point of Sales Receipts Supply Chain	CB08:08:003
Aanish Chaudhuri Subhamoy Ganguly Matthew Bayani	Unpacking the Role of Cognitive Biases in Supply Chain Management Decision-Making: An Interdisciplinary Approach	CB08:08:003
Nimasha Thotawattage Sanjaya Kuruppu Christine Helliar Dinithi Dissanayake Anisha Fernando	Blockchain data integration of off-chain systems: Exploring interoperability and governance	CB08:08:003
15:00 – 15:30	**Afternoon Tea and Farewell SYMPOSIUM CONCLUDES**	

ABSTRACTS

SERVICES MANAGEMENT

Data-driven healthcare supply chain transformation: A case study of Victoria's largest public health service

Tayla Wilmot, Alka Nand, Amrik Sohal, Neil Sigamoney
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Purpose
Healthcare Supply Chain Management (SCM) remains an important topic for both academics and industry professionals but has recently faced numerous challenges as a result of the COVID-19 pandemic. With a specific focus on the health consumables procurement process within SCM, this paper explores how data-driven healthcare supply chains can employ key performance indicators (KPIs) to transform their processes towards becoming more people-centred, integrated with technology-enabled care in a pandemic challenged environment. Guided by this information, a digital supply-chain transformation framework will be co-developed.

Design/methodology/approach
Using a knowledge mobilisation lens, this paper undertakes a three-phased qualitative study of Victoria's (state in south-eastern Australia) largest public health service Monash Heath, involving a secondary study followed by a primary study and finally multiple forum discussions critical for co-developing a digital supply chain transformation framework.

Findings
Our study identifies several key indicators for improved performance in healthcare supply chains from a procurement perspective. Specifically, our findings suggest that to digitally transform an organisation, especially in a pandemic environment, organisation capabilities compatible with industry specific requirements and appropriate digital technologies are a necessary requirement for successful implementation and desirable outcomes. These findings further enabled the development of a digital supply chain transformation framework that can be proactively used by managers and practitioners embarking on a digital transformation journey for their organisations.

Originality/value
This paper, through its timely setting and context, contributes to healthcare knowledge by offering a co-developed digital supply chain transformation framework which can be a catalyst for improved healthcare services.

Keywords: Data-driven supply chains, Healthcare, Supply chain management, Pandemic

Multiproduct Price Competition on a Retail Platform

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Introduction

Online retail platforms have increasingly acted as both a reseller and a marketplace. Some retail platforms shifted from being pure resellers to allowing third-party sellers to sell on their platforms. For example, Amazon launched Amazon Marketplace back in 2000 which allows independent vendors to sell products on the marketplace (Rankin 2015). In addition, some platforms have shifted from being a pure marketplace to selling their own products. For example, Alibaba launched Tmall Supermarket in 2017 which sells a wide range of products together with the product manufacturers on the brand-focused Tmall website (Tong 2018).

In online retail platforms, a number of manufacturers adopt the hybrid selling strategy in which the manufacturers sell their products directly to consumers on the platforms by paying a commission fee while wholesaling the products to the platforms for reselling. Examples of this abound. Under Armor, GNC, and Anker sell their products on Amazon Marketplace while also supplying these products to Amazon. Electronic appliances manufacturers (e.g., Dyson and Midea) and computer manufacturers (e.g., Lenovo) also adopt this selling strategy on JD.com (Ha et al. 2022). Common to the practice is that a manufacturer often sells more than one product on a retail platform. For example, Lenovo sells four laptop models on JD.com, and there are a number of product variants for each model on offer. In this paper, we study multiproduct firms' optimal pricing behaviors in the hybrid setting and examine how the optimal behaviors are influenced by changing market and operational conditions.

Literature Review

This work is concerned with price competition between a manufacturer and an online retail platform. There is a stream of papers that study multiproduct price competition in the literature (see e.g., Li and Huh 2011, Gallego and Wang 2014). Our model represents an important extension of this literature. Existing models do not consider retail platforms, and thus the extra source of revenue for the platform (in the form of commission fees) and the manufacturer (via direct sales to consumers) is absent from those models.

There is a growing literature on retail platforms. Existing studies have focused on various problems including channel design, platform contracting, and information sharing. Most of the literature studies the firms' choice between agency selling and reselling, but we are aware of one paper that considers a hybrid structure in which agency selling and reselling coexist on a platform (Ha et al. 2022). This paper studies the optimal channel structure for a manufacturer and an online platform that exerts promotional effort to enhance the total demand on the platform. While the focus of their paper is on channel structure and promotional effort under Cournot competition, we focus on multiproduct price competition under the multinomial logit framework in line with empirical evidence.

Method

We develop a game theoretical model to characterize the pricing behaviors of a manufacturer and a platform owner. The manufacturer produces more than one product that can be sold via both agency selling and reselling modes on the retail platform. Each player simultaneously determines the retail prices of those products. We also study the impacts of agency selling and reselling on the firms' profits.

Findings

We start by showing that for retail pricing decisions, it is optimal for each firm to charge an identical retail margin for all the products they offer. This result extends the classic result of the equal-margin policy for a firm's pricing optimization under MNL (Anderson et al. 1992) to our platform setting. From a technical standpoint, this reduces the complexity of the problem significantly and allows us to show that there is a unique Nash equilibrium for the pricing game. Our numerical studies show among other

results that, as the number of products increases or the consumers are more heterogeneous, both firms make a higher profit.
In comparison with the pure reselling model, we show that the platform benefits more under the hybrid model when there is a smaller number of products, or the consumers are less heterogeneous. Compared with the pure agency selling model, we show that the manufacturer may be worse off by introducing the reselling mode, when there is a large number of products, or consumers are highly heterogeneous.

Contributions and Implications

The contributions of this paper are two-fold. The first contribution is theoretical in that our paper fills an important gap in the literature by studying price competition between a multiproduct manufacturer and a platform. Our second contribution is practical in that this paper provides useful guidance on optimal pricing decisions for the platform and the manufacturer. For example, both firms should set an equal (adjusted) retail margin for the products. We also show that introducing the agency selling mode benefits the platform only when there is a small number of products, or the consumers are highly homogeneous. Introducing reselling benefits the manufacturer only when the commission rate or the wholesale margin is high.

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An investigation into Revenue Leakage Problem in the 3PL Industry sector in Australia

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Introduction

The purpose of this paper is to review the Revenue leakages (RL) problem faced by 3PL (Third-party logistics) service providers in Australia using a Grounded Theory research strategy to develop a comprehensive definition of RL and discovery of RL characteristics, RL detection and prevention methods.

The 3PL service providers have many definitions and interpretations. According to Yang (2014), 3PL service providers are external logistics service vendors offering single or multiple logistics activities to their customers, typically on a contract basis. Revenue leakage is a significant problem 3PL (Third-party logistics) service providers face in their business. According to Haniefuddin and Baba (2013), 3PL service providers face challenges in recording and collecting all the revenue they are entitled to, and if 3PL service providers do not actively look for revenue leakages, it can go unnoticed indefinitely.

Literature Review

Academic research papers on the topic of revenue leakages in 3PL Industry Sector remain scarce despite it has been discussed widely in industry and thought leadership papers published by top-tier consulting firms such as KPMG (2012), E&Y (2013). Therefore, following inductive approach (Webster and Watson, 2002, Tranfield et al., 2003, Seuring and Gold, 2012) I conducted a systematic Literature Review of 51 articles (published 2000-2022) on revenue leakage related publications. Further, I have attempted to build my research based on existing knowledge by following well-established grounded research method techniques that Strauss (1987) had advocated. The SLR process I have adopted is an iterative approach to categorize the main research clusters. I have deployed descriptive content analysis and thematic analysis method with the aid of NVivo 12 software to identify the main groups and the themes from the short-listed pool of articles.

Method

A Grounded Theory research strategy using descriptive, thematic, and content analysis of data from a Systematic Literature Review of 51 articles (published 2000-2022) related to revenue leakages and data collected from semi-structured interviews (Interviews conducted 2022 – 2023) of 3PL Practitioners based in Australia.

To conduct interviews, I obtained ethics approval from Swinburne University's Human Research Ethics Committee (HREC).

Findings

There has been a considerable focus on reducing revenue leakages in other industry sectors, but Research into the 3PL sector is still being determined. Based on interview data from practitioners, formulating a definition of RL from the context of 3PL logistics. Research has emphasised the standardisation of RL definition and identification of reasons for the RL from the 3PL sector perspective. Furthermore, this Research has identified the main RL detection and prevention methods followed in the 3PL sector. I also identified future research directions for RL deterrence in the 3PL industry.

Contributions and implications

A broad, contemporary understanding of RL from the 3PL industry sector is provided, and a new, comprehensive definition is presented covering the RL Characteristics, RL detection methods and RL prevention methods. The research agenda guides future work towards the maturation of the Revenue Assurance discipline in the 3PL industry sector. Guidance is provided to 3PL practitioners, managers and owners of 3PL firms on RL Standard definition, RL characteristics, and RL Detection and

Prevention Methods relevant to the 3PL industry sector. 3PL Practitioners are encouraged to adopt a holistic approach to controlling RL.

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Service inclusion and Transformative Service Research: a new perspective on customer journey mapping for vulnerable people using residential aged care services

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Introduction

With the rapid increase in ageing population and strong demand for resources to meet the needs of elderly individuals, maintaining older people's well-being has placed enormous pressure on frontline employees (FLEs), aged care organisations and the Australian government (Broadbent et al., 2009). This is especially true when catering for vulnerable older people in nursing homes as it often requires specialised skills to meet their preferences and care needs (Post et al., 2010; Wittorff et al., 2023). In fact, the situation is projected to intensify (Australian Bureau of Statistics, 2019; Shishehgar et al., 2019). Dementia Australia (2023) reports that approx. 68% of older Australians using residential aged care services have moderate to severe cognitive impairment, and the number is expected to grow in the years to come.

There are growing concerns about aged care customer variabilities (six customer variabilities (Frei, 2006; Yang, 2011)) and customer heterogeneity. Studies identified that older people can be unpredictable and more heterogenous than other age groups (Moschis et al., 1997) due to factors such as personalities, health conditions, cognitive ability, and so forth (Martin & Pranter, 1989). These differences among the elderly contribute to great heterogeneity. Fulfilling each resident's special needs, thus, serves as the basis of accommodating residents' potential variability and heterogeneity, leading to individualized and personalized services, ultimately enhancing the well-being of each individual resident in nursing homes. Yet, minimum consideration has been given to this important subject in nursing homes.

Further, customer contact theory (Sampson & Froehle, 2009) highlights that the extent and type of customer contact directly links to customer inputs related to interactions. This emphasises the profound impact of customer interaction and input on co-production of services in the service environments. Karmarkar and Richard (1995) argued that one of the concerns derived from customer contact and co-production is customer heterogeneity. The authors emphasised that adapting a certain broad approach unlikely contribute good services to a larger set of customers. In a nursing home setting, for example, a persona development study (Bryan-Fox, 2018) which developed three personas in a residential aged care emphasised the challenges faced by some residents when playing group games, such as bingo. The study also indicated that these individuals struggled and experienced difficulties with communication and expressing their thoughts and feelings, leading to frustration and dissatisfaction for themselves and also other participants (Chou et al.). *"To a large extent, other customers in the service environment are part of the service"* (Martin & Pranter, 1989, P. 6).

Along these lines, many older individuals' expectations and experiences in nursing homes seem to have been marginalized or underserved in a fair manner, which has led to negative feelings or even incidents such as abuse, neglect, and discrimination (Buzgova & Ivanova, 2011; Gerritsen et al., 2019; Manthorpe, 2015; McDonald et al., 2012; Moyle, 2019). This can be in part attributed to an aged care organisation's lack of intention in the design of service inclusive systems. In fact, these limitations in the service process can incur significant costs (Samaranayake et al., 2015).

Despite the importance of accommodating residents' needs, preferences and alleviating incidents, little attention has been given to developing a fair service system in a current nursing home setting. Therefore, leveraging the Transformative Service Research (TSR) literature and utilising the notions of service inclusion and service exclusion as the base of our study (Anderson & Ostrom, 2015; Fisk et al., 2018; Rosenbaum, 2015; Russell–Bennett et al., 2020), this conceptual study aims to explore the feasibility of designing an egalitarian service system that enables service inclusion, offering opportunities, choices, relieving suffering and enhancing happiness, for the care of older individuals by addressing the above service provision limitations such as a lack of attention in resident variability, heterogeneity, customer contact and co-production of services. In doing so, we employ customer journey mapping to visualise

a 5-hour residents' journey in a typical morning, to identify touchpoints, bottlenecks, and pain points through the adaptation of three customer personas (Enid, Bianca and Arthur) that were developed by (Bryan-Fox, 2018). The findings of this conceptual study could have viable managerial and practical implications and contribute value to the limited literature on service design within aged care industry sector. Thus, we will discuss the literature reviews in the next section.

Literature Review

Customer heterogeneity indicates that customers may have different preferences, goals or needs (Martin & Pranter, 1989). This notion is supported by the finding from a targeting mature market study (Moschis et al., 1997), identifying that older consumers who exhibit a higher degree of variability in the way they talk, think and act, can be more heterogenous in a service provision process, while Martin and Pranter (1989) argued that customer heterogeneity may be attributed to customer's variabilities in special preferences and intended needs. In this sense, the special needs of older people can refer to medical, social, dietary, physical, and personal care preferences.

Customer heterogeneity and variability can profoundly impact service delivery and service quality in a nursing home setting, as services appeal to one group of older people might not appeal to another (Moschis et al., 1997). Nevertheless, customized service provision and service quality is imperative, there is a lack of research literature addressing these residents' variability and heterogeneity in nursing home settings.

Further, the notion of customer contact (Sampson & Froehle, 2009), co-production of services contributes to customer heterogeneity (Karmarkar & Richard, 1995) and variability. This is particularly true when interacting and co-producing services with older people in nursing homes. AIHW (2023) reports that there are approximately 126,000 older people with mild to severe cognitive impairment using residential aged care services. Drawing on (Frei, 2006)'s typology of customer variability, the author proposed five variabilities, including arrival variability, request variability, capability variability, effort variability, subjective preference variability, and communication variability was proposed by (Yang, 2011). That is, older people in nursing homes can have varying degrees of ability, energy, willingness, and communication skills to interact, participate and add reliable and viable input in service process as most of them have limited ability to provide valuable input and co-develop services effectively. Though this notion has been extensively affirmed in various domains, including banking (Amelia et al., 2021), supply chain management (Lusch, 2011; Sampson, 2000), and service innovation (den Hertog et al., 2010; Vargo & Lusch, 2007), the importance of the notion has been underemphasised in nursing home settings due to various reasons, such as lack of expertise, cost-cutting approaches and organisations' assumptions on customers' needs (Natan et al., 2010; Wirtz et al., 2018; Yeh et al., 2021).

In recent decades, studies have urged the demand for an egalitarian approach to fulfil old people's real needs regardless of their circumstances. To achieve inclusion in aged care services, enabling fair access, equal treatment, and equal opportunity to opt out a service (Fisk et al., 2018), aged care organisations and governments alike, as consistent with TSR paradigm (Anderson et al., 2011), should place the uplifting changes and enhancements of both individuals and societal welfare at a focal point of the service research. Considering the vulnerability of residents in nursing home, understanding their preferred daily routine is vital for providing individualized and relationship-based services to fulfil older people's identified needs.

Aligning with this trend, taking a user-centred approach (UCD) (de Graaf & Ben Allouch, 2013; LeRouge et al., 2013; Moyle et al., 2018; Salichs et al., 2015) and integrating customer personas and customer journey mapping into service inclusion and TSR seems to be a viable approach for service (re) design (Davies et al., 2022). Customer persona development is seen as being appropriate; it segments customer on their characterises and behaviour rather than traditional market segmentation approaches (LeRouge et al., 2013), while customer journey maps are visualisation tools that track the service delivery over time and capture the persons emotional state (like and dislikes) at various stages of the service delivery process (Følstad & Kvale, 2018) irrespective if the service is delivered by one service provider or a set of service providers (Crosier & Handford, 2012). This enables multiple stakeholders to assess the process objectively and identify areas for service improvement or service innovation (Davies et al., 2022).

To conclude, incorporating personas and customer journey mapping into the concept of service inclusion and TSR can be adapted to address practical issues in our society, including service inclusion

of vulnerable people with limited capabilities or tackling issues, in terms of inequality, social justice, human dignity, discrimination and oppression (Creswell & Creswell, 2023).

Methodology

Persona, as a conceptual model of cluster analysis, can be utilized to facilitate service analysis, the design, development of new systems (LeRouge et al., 2013) or the improvement of existing service systems. Personas have been developed for the care of older individuals across industry sectors, including mobile technology (Abd Malik & Azuddin, 2013), healthcare (Holden et al., 2017; Valaitis et al., 2019), information systems (Schafer et al., 2019) and living conditions (Bennetts et al., 2020). Drawing on an exploratory research conducted recently on persona development in an aged care setting in Sydney, the research by Bryan-Fox (2018) included low and complex care units (dementia care was excluded). Approx. 50 residents and 3 staff members were participated, and her research took a human-centred approach through in-depth interviews (3 staff and 12 residents) and 30 hours of observations to identify resident's needs, preferences, behaviours for qualitative research. The personas were developed to *'fit for purposes'* (Bryan-Fox, 2018, P. 46), and their patterns were examined using a variable mapping technique and visualised using a double diamond design process model (CPA Australia, 2020). Concurrently, the three final personas (see Appendix) were reviewed by key stakeholders for service provision and service improvement. In this sense, the process of persona development and the identification patterns of resident groups to highlight areas for improvements align well with the aim of our study.

Therefore, we adapted these three existing personas from Bryan-Fox (2018)'s research, which acknowledges customer service heterogeneity. In our research, however, we utilized customer journey mapping as a service design tool, leveraging my own working experiences in the aged care frontline workforce to develop maps of a 5-hour morning routine (see Appendix). The data for journey mapping was extracted from the profile of each persona (i.e., goal and motivation, pain points and fears, likes and dislikes). The three maps highlighted elements such as pain points, the potential influential elements for service delivery (resident's own situation, organisation, or service context (other residents' behaviour)), and potential solutions. Further, all relevant elements in the journey maps were tested and compared, serving as a foundation of our study for the design of service inclusion, in order to address limitations in the current residential aged care service systems, enabling opportunities, offering more choices, and improving happiness of all residents using residential aged care services regardless of their circumstances.

Contributions and implications

The contributions of this paper are twofold. First, to the best of our knowledge, this is the first study taking different lens by visualising a typical morning for three customer personas using residential aged care services. This can contribute to the limited literature on mapping residents' journey within aged care sector. Second, to our understanding, this study is the first to integrating customer journey mapping into the novel perspective of service inclusion and TSR design, enabling managers to identify and address the limitations existed in the current service provision. This could offer valuable insights for managerial and practical implications in not only aged care sectors, but other sectors focused on the well-being of vulnerable older people in general. The novel approach proposed in this study can effectively visualise the resident's pain points, experiences, and their feelings of using the service, allowing managers to gain a better understanding of each individual resident's daily journey, real needs, preferences, and unmet needs. This could urge managers to seek viable solutions to accommodate residents' variability and heterogeneity sustainably, enabling each older individual to access, utilize and exit a service or a set of services in a fair manner. Integrating journey mapping into this novel perspective provides managers deeper insights into the areas for improvement (i.e., the demand for adopting other means such as technology) or even redesign of the service provision, providing older people with more opportunities, offering options, fulfilling special needs, and enhancing older people's well-being.

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Envisioning the Next-Generation Banking Service System: A Model for Innovative Digital Transformation of Banking Front-End Operations and Services

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The pandemic resulted in a profound and far-reaching impact, ushering the world into an era characterised by isolation, despondency, and widespread devastation. Its adverse effects reverberated across the global economic landscape, impeding international trade and investment, and casting long-lasting shadows over various industries worldwide. Among the enduring repercussions and perhaps the most conspicuous, is the erosion of confidence and the waning enthusiasm for active engagement in innovative value-creation endeavours. On the contrary, in some sectors, the turbulence stemming from the pandemic compelled a radical transformation of consumer behaviours, unexpectedly presenting new opportunities for enhancement and innovation. One such industry that experienced this transformative shift is the banking sector in China. Illustratively, within the Chinese context, a fundamental value known as "Jian Mian Qing 见面情" assumes great significance, and its direct translation into English is 'the affection experienced when meeting face-to-face'. This concept encapsulates the synergy forged when individuals convene face-to-face. Historically, the Chinese banking landscape had firmly adhered to the "Jian Mian Qing" ethos, with customers preferring physical branch visits for their financial transactions and pivotal decisions. However, the pandemic rendered this 'face-to-face' banking service laden with risk, ultimately causing it to be impractical during times of isolation. Consequently, individuals reluctantly turned to internet banking, phone banking, and various automated services that lacked the human warmth and personalised touch of in-person interactions. As the pandemic compelled a prolonged reliance on these digital alternatives, both digital natives and digital immigrants found themselves adopting mobile and remote banking services. This shift in behaviours and preferences, predominantly influenced by the pandemic, has significantly weakened the resistance to non-'in-person' banking services, including automated, web-based, digital, mobile, and remote options. Amidst this transformative trend, novel challenges have arisen, as supplementary online and mobile services have now evolved into indispensable offerings equal to those of the physical branch. What was once merely a qualifier of service quality has morphed into the determinant of excellence. This enduring trend has simultaneously engendered enormous opportunities for banks to innovate, compelling them to partake in a fresh industry competition cycle. Amidst this new phase of the post-pandemic banking competitive landscape, several pivotal themes have emerged , including digital transformation, the interplay between architectural innovation versus disruptive innovation, sustainability, inclusiveness, the ascendancy of hubification and platformisation, the leverage and integration of hybrid solutions, and empowerment paradigm. This exploratory study employs the grounded theory methodology to investigate and examine a conceptual spectrum spanning from ubiquitous banking and mobile banking to remote banking, branchless banking, neobanking, cloud banking and of meta banking. The overarching objective is to establish a foundational set of concepts and theories for constructing, describing, and outlining the rudiments of the forthcoming generation of front-end operational banking systems. This envisioned system is conceived as a hybrid amalgamation of mechanisation and human agency, which is an integrative, ubiquitous, empowering, collaborative, and intelligent banking service system. Furthermore, a complementary model will be devised to enhance these theoretical constructs.The theoretical underpinning forged by this inquiry will not only elucidate the evolving trajectory of the banking system but also illuminate the future of banking system iterations and innovative digital transformations within the industry.

SUPPLY CHAIN RISK MANAGEMENT

Organizational Resilience in the Perspective of Supply Chain Risk Management: A scholarly Network Analysis

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Anecdotal evidence in the last decade shows that the occurrence of disruptive events and uncertainties in the supply chain is increasing. The coupling of these events with the nature of an increasingly complex and interdependent business environment (Gualandris et al., 2021) leads to devastating impacts that quickly propagate within and across organizations (Dolgui & Ivanov, 2021). For example, the recent COVID-19 pandemic increased the global supply chain disruption frequency by at least 20% in 2020 (BCI, 2021) and is projected to have an accumulative cost of $13.8 trillion by 2024 (IMF, 2022). This crisis raises attention to organizational resilience to weather business uncertainty (Wieland & Durach, 2021). However, the concept has been criticized for being vague and lacking a consistent definition, thus reducing the significance of the concept for practice and research (e.g. Burnard & Bhamra 2011; Linnenluecke 2017). This study is intended to solve that issue by providing a comprehensive review of the conceptualization, measurement, and antecedents of operational resilience that have been discussed in the supply chain risk management literature (SCRM).

We performed a Scholarly Network Analysis, combining citation-based and text-based approaches, on 252 articles published from 2000 to 2021 in top-tier journals based on three parameters: AJG ranking and ABS ranking (Kamalahmadi & Parast, 2016), UT Dallas and FT50 list (Pournader et al., 2020), and editorial board review (Seyedghorban et al., 2021). We utilized a hybrid scholarly network analysis by combining citation-based and text-based approaches (Yan & Ding, 2014) to understand the conceptualization, measurement, and antecedents of operational resilience in the supply chain risk management literature. Specifically, we employed a Bibliographic Coupling Analysis in the research cluster formation stage and a Co-words Analysis in the research cluster interpretation and analysis stage (Donthu et al., 2021).

Our analysis reveals three major research clusters of resilience research in the SCRM literature, namely (1) *supply chain network design and optimization*, (2) *organizational capabilities*, and (3) *digital technologies*. We portray the research process in the last two decades in terms of the exemplar studies, problems studied, commonly used approaches and theories, and solutions provided in each cluster (Table 1). We then provide a conceptual framework on the conceptualization and antecedents of resilience based on studies in these clusters (Figure 1) and highlight potential areas that need to be studied further. Finally, we leverage the concept of abnormal operating performance (Barber & Lyon, 1996) to propose a new measurement strategy for resilience. This measurement overcomes the limitation of most current measurements that are event-dependent and focus on the resistance or recovery stage - without capturing the growth stage.

Table 1 Research Clusters

	Cluster 1	Cluster 2	Cluster 3
Unit of analysis	network	Individual, dyadic	Individual, dyadic, triadic
Problems	Risks and its propagation	Risks and its propagation	Risks and its propagation
Objectives	Financial performances	Operational continuity	Operational revival
Research approaches	Analytical	Empirical	Analytical and Empirical
Solutions	Planning and modification of supply chain network topology	Orchestration of resources within the supply chain to achieve specific capabilities	Integration of digital technologies within the supply chain
Themes	Supply chain network design and optimization	Organizational capabilities	Digital technologies

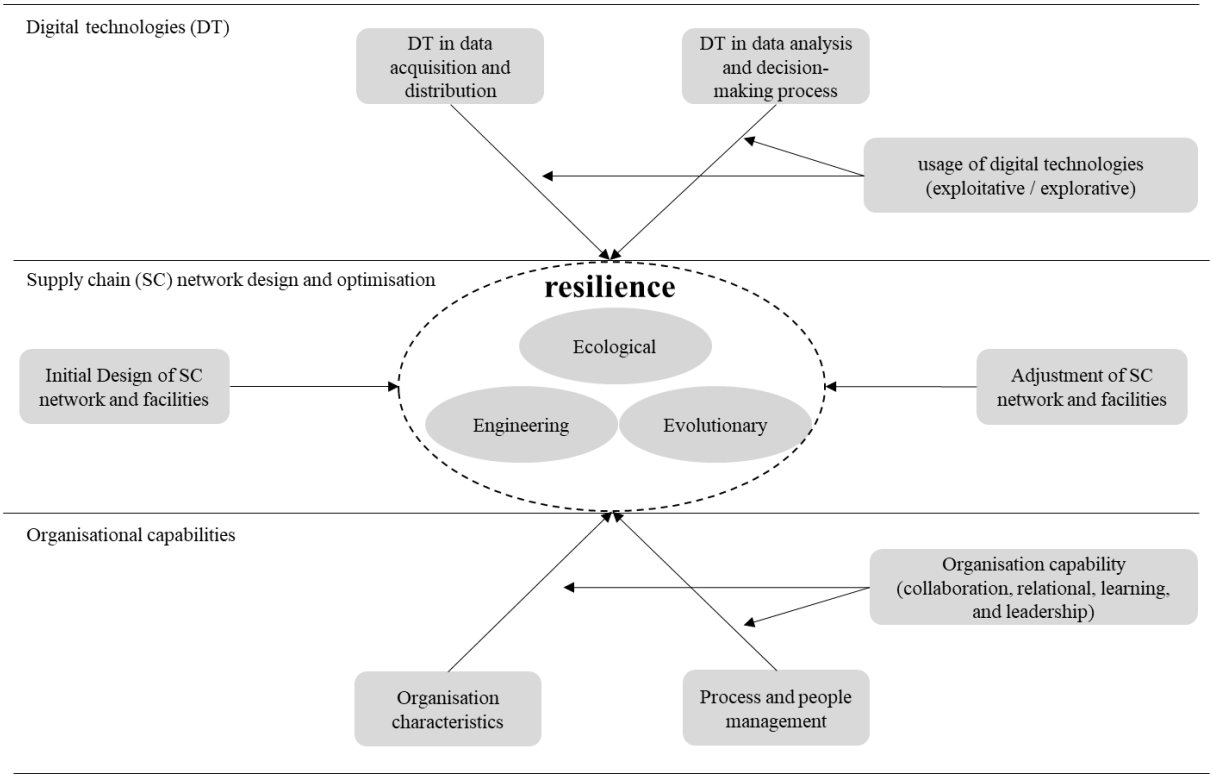

Figure 1 Antecedents of Resilience

In conclusion, this study provides a robust literature review through a scholarly network analysis that increases the completeness and accuracy of research cluster identification and analysis (Moher et al., 2009) to understand conceptualization, antecedents, and measurement of resilience. It also enables us to perform a comprehensive review of resilience research in SCRM literature by including research articles published during the pandemic (Sodhi & Tang, 2021) and connects this development with a plethora of articles published in the last two decades (Ho et al., 2015; Pournader et al., 2020). From the managerial perspective, this study provides practitioners with clarity on the conceptualization and critical success factors of firm resilience from the SCRM perspective.

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An Interpretative and Explainable Approach to Manage Supply Chain Risks

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Introduction and Literature Review

Optimization-oriented methodologies find widespread application within the domain of Supply Chain Risk Management (SCRM) to alleviate imbalances between supply and demand, particularly when addressing internal disruptions (Paul et al., 2022). However, their effectiveness diminishes when dealing with the proactive identification of dependent disruptions cascading across a multi-tiered Supply Chain Network (SCN) and the subsequent assessment of their impact (Bodendorf et al., 2023). To bridge this gap, Machine Learning (ML) and Deep Learning (DL) models have been harnessed for the predictive assessment of disruption variables spanning multiple echelons (Ahmed et al., 2022). Nonetheless, the utilisation of these models is restricted to disruptions with established historical occurrences, revealing a dual limitation. Primarily, they fail to anticipate novel or undisclosed disruption events void of historical precedent across the SCN. Secondly, these models tend to disregard the influence of uncertain external variables on the predictive precision of the identified disruption events. The infusion of Reinforcement Learning (RL) can address these concerns, permitting supply chain managers to adapt adeptly to dynamic real-world environments. RL algorithms offer the capacity to optimise decision-making processes through assimilating experiential knowledge and feedback, thereby furnishing supply chain managers with astute decisions amidst intricate and uncertain settings. Yet, despite its potential merits, the integration of RL into prevailing SCRM frameworks remains underexplored within extant literature (Ordibazar et al., 2023).

Although ML and DL models substantially contribute to SCRM by automating procedures and yielding insightful foresight, their operational opacity remains a notable predicament (Nimmy et al., 2022). While these models adeptly identify disruptions and risks, they falter in expounding the rationale behind identifying specific disruptions. The absence of such elucidations confines the scope of risk management professionals in comprehending the antecedents of disruptions and prescribing optimal strategies to effectively address distinct risk factors (Aboutorab et al., 2022). This schism engenders a disjunction between risk identification, assessment, and management tasks, thereby undermining response congruence (Bassiouni et al., 2023). Consequently, an imperative arises to explore the realm of both familiar and enigmatic dependent disruptions pervading the SCN with a prism of transparency and interpretability. Counterfactual Explanations (CE) emerge as a significant approach to address this gap in scholarly research, providing examples of alternative optimal decisions and their resulting outcomes. This empowers decision-makers with the ability to consider trade-offs (Aboutorab et al., 2022) carefully. Despite its potential, the use of CE in Supply Chain Risk Management (SCRM) remains an unexplored area in current academic literature. Therefore, the current initiative aims to bridge this void by developing AI models specifically designed for SCRM. These models will focus on promptly identifying and mitigating real-time risks while offering CE-based explanations to stakeholders. The expected results of this effort encompass improved resilience in supply chains and a corresponding reduction in disruptive incidents.

Method

The research's methodology has three well-thought-out and designed research tasks. In ***Task 1,*** we model a typical SCN for a hypothetical industry problem with its upstream suppliers across multiple echelons (tiers). In ***Task 2***, we proactively use RL to identify known and unknown uncertainties impacting the supply network. In ***Task 3,*** we develop a Counterfactual Explanation (CE)-based model recommending strategies that the decision maker can use to manage disruptions. The research will use the analysis from task 1 to develop a mixed-integer non-linear programming (MILP) model in the normal state (with no disruptions) as a multi-level optimisation problem. This requires the identification of multiple objectives and constraints at different tiers that need to be achieved and satisfied, respectively.

Depending on the complexity of the SCN, either an exact or traditional optimisation (e.g., branch & cut approach) (Chakrabortty et al., 2015) or a meta-heuristic (Chakrabortty et al., 2020) algorithm will be designed that achieves local and near-optimal solutions. Later, CE will be proposed to find a perturbation vector to alter the n-dimensional input vector so that the undesirable result of the given record changes to a desirable result while not violating the constraints. The same optimisation models will be applied again.

Contributions and Implications

This research work will help practitioners proactively identify the potential disruptions impacting their upstream suppliers to be considered while developing their SCRM strategies. This aim focuses on knowledge discovery. Its benefit is that it will bring to the attention of the risk manager the dependent uncertainties (known and unknown risks) that can potentially impact the focal firm or its suppliers in meeting their objectives. This will also aid in ascertaining the impact of the identified dependent disruptions on their operations. Furthermore, this work develops an explainable decision-making approach that can assist companies in managing disruptions in the presence of conflicting information. This aim focuses on knowledge-driven optimisation and explainability, and its benefit is that it considers risk identification, assessment, and management tasks conjointly when strategies are recommended to manage disruptions.

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An Intelligent Decision Support System for Defence Supply Chain Risk Management

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Introduction

Supply chain problems in the defence industry may lead to disastrous casualties. An effective and efficient supply chain risk management process is critical for the defence industry sector to acquire quality and technologically advanced products at affordable costs (Güneri & Deveci, 2023). However, existing frameworks for defence supply chain risk management have limited focus on the interdependency modelling of supply chain risks. In addition, considering the complexity-related aspects involved in the defence supply chain risk management, appropriate advanced methods and techniques should be investigated to improve the decision-making processes, particularly for risk assessment and subsequent risk treatment. The main research problem of this work is: how to develop an intelligent decision support system (DSS) to make better decisions during supply chain risk management for the defence industry, where multiple characteristics of supply chain risks, including risk occurrence probability, risk impact, complex risk interdependencies, risk propagation behaviour, and stochastic behaviour of risk occurrence can be analysed simultaneously. In this study, appropriate artificial intelligence (AI) techniques are explored to support the digitalisation of supply chain risk assessment (SCRA) and subsequent risk treatment in the defence industry. The research findings from this work can provide scientific and translational supply chain risk management knowledge to practitioners in the defence industry and accelerate the AI applications to the Australian Defence sector, safeguarding the military deliverables of products and services and reducing the burden on defence expenses in Australia.

Literature Review

The supply chain is a global network involving individuals, resources, activities and all the steps in the process that the product is delivered to the customer from the initial manufacturer (Güneri & Deveci, 2023; Hammi et al., 2023). In today's military, defence projects tend to not only have a large number of activities and capital-intensive investments but also possess a high level of uncertainty, involve many stakeholders ranging from local communities and companies to foreign governments and organisations, employ innovative technologies to obtain desired operative performance, be time critical in order to have a strategic advantage over potential threats, be subject to strong internal and external political interference (de Rezende et al., 2021; Rodríguez-Segura et al., 2016). Thus, defence sector organizations manage a complex and unique supply chain due to the nature of their operations in national defence and other support activities. The defence supply chain is potentially exposed to diverse risks. The ultimate goal of defence supply chain risk management is to optimise defence capability and provide material and resource readiness with an acceptable level of risk while minimising the overall supply chain's costs.

Since interdependent risks have the potential to propagate through numerous pathways, a chain reaction or domino effect phenomenon – the extreme case of the risk propagation behaviour – can emerge because of "cascading interdependencies" (Ellinas, 2019). To improve the accuracy of SCRA results and the ability to predict risk emergent behaviours in time, the effects of risk interdependencies should not be ignored. In practice, the classical Probability–Impact (P–I) risk model is popularly adopted to prioritise and categorise risks through an aggregated measure of risk importance or a P–I risk matrix (Aven, 2016). However, such risk models, in fact, ignore the cause-effect interdependencies among supply chain risks and the associated effects caused by risk propagation. Based on the literature review, there is a limited focus on the interdependency modelling of supply chain risks in previous studies (Qazi et al., 2018). Therefore, a transformation of existing frameworks of supply chain risk management is needed to uncover the real complexity of supply chain risks. More effective techniques and tools empowered by AI methods should be explored to support the improvement of supply chain risk

management capability. In this work, the research outcomes regarding an intelligent DSS for defence supply chain risk management contribute to advancing the digital transformation of risk management in the Defence sector.

Method

This work develops a novel intelligent DSS for defence supply chain risk management by leveraging appropriate analytical methods and AI methods. The detailed flowchart of the proposed methodology is given in Fig. 1.

In the first stage, a hierarchical supply chain RIN is developed based on the systematic Interpretive Structural Modelling (ISM) process after identifying defence supply chain risks and their cause-effect interdependencies. The ISM is an interactive learning process to identify complex interrelationships among elements in a system, which can structure all the interrelated elements into a comprehensive systematic model (Warfield, 1974). Through the application of transitive inference, indirect interdependencies between a pair of supply chain risks can be determined by identifying risk paths in the ISM-based RIN. Moreover, possible risk loops can also be easily identified according to partitioned hierarchy levels.

In the second stage, a comprehensive SCRA framework is developed, whose originality lies in integrating appropriate analytical methods (i.e., Social Network Analysis (SNA) and the classical P–I risk model) and AI methods (i.e., Monte Carlo Simulation (MCS)) to evaluate supply chain risks and the overall risk level of the defence supply chain (both locally and globally) by simultaneously capturing multiple risk characteristics. Specifically, the SNA method enables the analyses of risk positions in a supply chain RIN based on local and global measures. The MCS is tailored to model the stochastic behaviour of risk occurrence within a supply chain RIN. The classical P–I risk model is incorporated to support the evaluation of risk influences on project objectives. This stage can well account for the effects of risk propagation on SCRA results based on proposed interdependency-based risk indicators.

In the third stage, appropriate risk treatment actions can be formulated based on the SCRA results obtained from the previous stage. The performances of different treatment actions are compared by re-evaluating supply chain risks and the overall risk level after the risk treatment implementation.

In the fourth stage, an optimisation model for optimising supply chain risk treatment decisions is proposed considering risk treatment cost and resource constraints. The Non-Dominated Sorting Genetic Algorithm (NSGA-II) is adopted to solve this risk treatment optimisation problem. Subsequently, according to the decision makers' risk attitude and the organisation's risk appetite, the most effective risk treatment option can be selected from Pareto-optimal solutions obtained through the proposed intelligent DSS.

Findings

Based on "systems thinking", the proposed intelligent DSS for defence supply chain risk management can evaluate supply chain risks and the overall risk level of a defence supply chain by incorporating the effects of risk propagations. In addition, numerous risk scenarios generated in the simulation process facilitate more realistic SCRA results considering multiple risk characteristics under complex and uncertain environments. Further, based on the proposed informative platform, the performances of different risk treatment actions can be evaluated and compared automatically, contributing to an efficient selection of the most effective risk treatment option in accordance with the decision-makers' risk attitude and the organisation's risk appetite. Therefore, this research adds an innovative perspective to the current supply chain risk management in the defence industry.

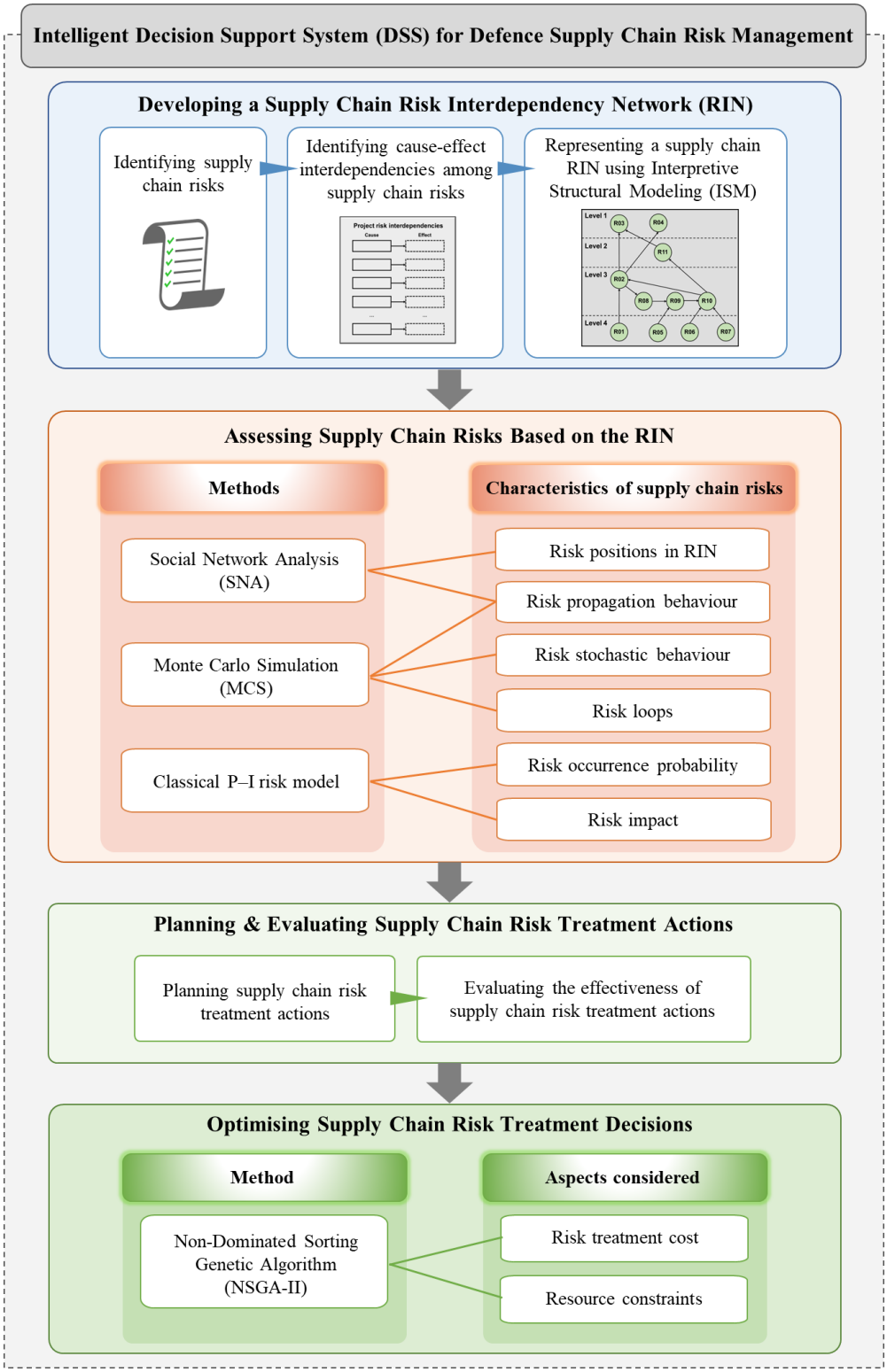

Fig. 1 The framework of the proposed intelligent DSS for defence supply chain risk management.

Contributions and Implications

The research findings lead to multiple managerial implications for the defence industry and government sectors, which are listed as follows.

Senior decision-makers and practitioners in the defence industry can have a more comprehensive and better perception of risk conditions of their involved defence supply chain by considering complexity-related aspects of supply chain risks. This is beneficial to mitigate the negative effects of supply chain risks more proactively.

The research findings can strengthen the benefits of applying intelligent supply chain risk treatment decision-making process to the defence industry, enabling minimising risk influences via early planning and allocating necessary resources. This can realise cost savings on a significant portion of the Defence spending.

The proposed intelligent DSS can be used to support risk management throughout the whole process of the defence supply chain, which is easier to update risk conditions periodically when new risk information is captured.

The proposed intelligent DSS is designed with high universality and flexibility so that it can be tailored to the supply chain risk management in other industries.

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Linking supply chain risk with emerging digital technologies within food and beverages manufacturing supply chain: An empirical quantitative study

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The term 'supply chain risk management' has long been a question of great interest in the field of operation. The resurgence of global events such as the US-China trade war, COVID-19 pandemic, and the Ukraine-Russia conflict created a collapse of the economic market and eventually shutting down of the global supply chain. It is apparent that supply chain structures will take time to recover and return to normal operations. As a result, supply chain scholars have been interested in developing strategies to mitigate supply risks and linking new digital technologies (such as machine learning and analytics) to mitigate disruption. A few models and theories have also been developed to mitigate supply chain risks. Building on the recent scholarly interest focusing on supply chain risk and emerging digital technology, this paper draws on quantitative survey method to examine supply chain risk level when intertwined with digital technologies both at the organisational and supply chain structure. To the best of author's knowledge, this is the first study to assess supply chain risk while combining organizational and supply chain structures concepts. Therefore, this paper addresses the following questions: *In what ways can supply chain risk within the Fasting Moving Consumer Goods supply chain be classified ? Is there a relationship between supply chain risk level and emerging digital technologies application within the Fasting Moving Consumer Goods manufacturing companies in Mauritius? In what ways can emerging digital technologies be leveraged to minimize supply chain risk at the supply chain structure and organisational level? What concepts are required to develop a risk management tool that can measure risk in volatile and complex environments?* The research questions how risk management models have been conceptualized and operationalized over the years by developing a risk management tool for managing supply chain risk in a complex and volatile environment. The contribution of this paper to the body of knowledge is fourfold: *firstly the paper conceptualized and operationalized concepts and variables that support the development of a risk management tool with the aid of digital technologies and analytics; secondly the paper measures supply chain risk within the FMCG manufacturing supply chain by applying two theories- normal accident and information process theory and finally the paper analysed how emerging digital technologies can be leveraged to minimize supply chain risk at the supply chain structure and organisational level.* This study applies two theories: normal accident theory (NAT) and organizational processing theory (OPT) to understand the phenomena under study. The NAT theory explains how supply chain risk and its impact on supply chain operations, while the OPT explains how to examine digital technologies and analytics capabilities to support decision-making. This paper provides an empirical survey design to measure supply chain risk level when intertwined with digital technology and analytics. Survey design is coined with context analysis to enrich the research methodology, by combing through firms annual reports and other available data. Ontologically, this study is built on the assumption that only a single true nature of reality exists. This translates into a post-positivist philosophical assumption that guides the mono-quantitative research method. A multi-case study approach is conducted to collect data from food and beverage manufacturing firms. Data is to be collected from 254 experts (sample size) employed in food and beverage manufacturing firms in Mauritius. The collected data are to be analyzed using the Statistical Package for Social Science (SPSS) and VinSim software to test for regression and correlations among variables.

Mitigating supply chain cyber disruption via flexible cooperative contract

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Introduction

Technological innovations, such as IoT and big data, have increased the interdependence and interconnectedness of firms operating in global supply chain networks. Besides the significant benefits, this trend is causing the critical infrastructure sector to become more vulnerable to disruptions, especially those caused by cyber-attacks. A disruption caused by cyber-attack may impose different degrees of risk on firms operating in the same geographical location, depending on their cybersecurity readiness.

With such uncertain disruptions and their high impacts, it is essential for critical infrastructure supply chain firms to develop strategies to combat them to mitigate potential supply shortages (Tomlin, 2006; Yang et al., 2009; Sawik, 2014; Snyder et al., 2016; Kamalahmadi and Parast, 2017; Berger et al., 2004). Diversification strategy is deemed as an effective strategy under cyber-attack disruptions considering that it provides more diversification protection because cyber-attack risks are specific to one supplier (Tomlin and Wang, 2011). For example, Coles, who is one of the main kill customers of JBS and gets processing done at several JBS sites, made alternative arrangements with other processing sites during JBS cyber-attack (Condon, 2021). In the case of Colonial Pipeline, the Charlotte Douglas International Airport complex was supplied by another major pipeline besides Colonial (Chiacu et al., 2021). From the above examples and various research (Anupindi and Akella, 1993; Silbermayr and Minner, 2014; Chopra and Sodhi, 2014; Swaminathan and Shanthikumar, 1999; Tang, 2006; Sawik, 2017; Australian Government Productivity Commission, 2021), it is obvious that diversification is a widely used strategy in industry and academia. However, with increasing complexity caused by increased competition, having only one mitigation strategy, such as diversification in sourcing, may not guarantee the fulfilment of supply due to the alternate supplier's availability and accessibility, high price, the hesitancy of alternate supplier to build extra production capacity to fulfil the retailers' increased demand and response time under disruption (Asian and Nie, 2014; Zhang and Wang, 2019; Xia et al., 2011; Mackenzie et al., 2014; Yin and Wang, 2018; Mohammadzadeh and Zegordi, 2016).

Similarly, while using supply chain contracts may seem a viable mitigation strategy, fierce competition among multiple retailers to access the limited capacity of the backup supply and consequent increase in market price persuade either retailers or emergency source to breach the agreement in pursuit of securing a higher profit. This not only raise serious question about the effectiveness of the implemented mitigation strategy, but also challenge both economic and social performance of the critical supply chains.

The above challenges are mainly attributed to the suppliers' vulnerability and the players' opportunistic behaviour, and thus high transaction costs if it makes such relationship-specific investment under uncertainty (Williamson, 1975; Williamson, 1981; Heide, 1994; Berger et al., 2004). Hence, suppliers need some form of incentive to invest in additional supply capacity to meet the buyers' need under disruption scenario (Asian and Nie, 2014; Tomlin and Wang, 2011) and safeguard themselves from the buyers' opportunistic behaviour. In addition, some governments have also devised support mechanisms, such as "critical infrastructure cyber security" and "supply chain resilience initiative", aiming to enhance the cyber security preparedness and resilience of the critical supply chains.

Methodology

This paper proposes a flexible cooperative procurement contract under a cyber-attack-driven disruption in a critical infrastructure supply chain. Using a multi-level game theoretical modelling approach, this paper studies the decision-making behaviour of an alternate supplier and two competing critical product retailers, who suffer from independent cyber-attacks. After deriving the retailers' optimal ordering policy under both separate and cooperative procurement strategies and the alternate supplier's pricing decision, we evaluate and analyse the government's economic welfare by calculating the consumer and producers' surplus. Comparing the obtained results under the separate and cooperative scenarios, we study the conditions under which the proposed flexible cooperative contract is beneficial to all members, including retailers, alternate supplier, and end consumer. Relaxing the main assumption of our model, we next endogenize the supply disruption parameter of the unreliable suppliers by using a security breach probability function that is widely used in the cyber security practice.

Findings

To capture the leadership role of government in enhancing critical infrastructure supply chain resilience, we then extend our base models and study the decision makers' problems under a regulated cyber security investment framework. In addition to the competing firms' and the alternate supplier's procurement and pricing decisions, in the regulated scenario, we investigate the investment decision of the government on enhancing the cyber security of the local critical infrastructure supply chains. Using an intensive computational study, we analyse the impact of government's cyber security investment decision on the individual players' ordering and pricing strategies, as well as the economic welfare. We finally examine the impact of different factors on the players' preference towards the deregulated and regulated scenarios.

Keywords*: Joint procurement; Flexible contract; Government support, Cyber security investment, Supply chain disruption*

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SUSTAINABLE SUPPLY CHAIN

Incentivising Circular Supply Chain Participation

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Introduction

The Circular Economy (CE) has been increasingly recognised as a pathway to sustainable development, as it provides an alternative paradigm to the dominant linear economic model (take, make, waste, dispose) that often generates a significant waste. Currently the world is only 7.2% circular, or put another way, over 92% of resources are being wastefully consumed (CGRI, 2023). According to the World Economic Forum, this will translate to an estimated 4.5 trillion economic opportunity by 2030 (Lacy et al., 2020). CE is particularly relevant for the agri-food sector, as globally one-third of all food produced is wasted (Soma, 2021).

Adopting and implementing a CE requires diversifying business models, including redesigning supply chains to embrace and integrate circular thinking (Hazen et al., 2021). However, little is known about the principles, processes, and outcomes that characterize circular supply chains (Howard et al., 2019). Knowledge about the characteristics of circular supply chain is critical to the development of CE in the agri-food sector. In this study, we seek to understand the drivers and incentives for agribusinesses to reconfigure into more circular supply chains, in order to intensify participation to circular supply chain and enhance circularity.

Literature Review

As an emerging concept, circular supply chain management (CSCM) aims to integrate circular thinking into the management of the supply chain and its surrounding industrial and natural ecosystems (Farooque et al., 2019). The literature recognizes that the transition to a CE requires supply chain management transformation, CSCM extends the boundaries of earlier sustainable supply chain concepts such as closed-loop supply chains and green supply chains, and enables a higher level of supply chain circularity by recovering value across different supply chains that partner with firms in the same or different industry sectors (Zhang et al., 2021).

Depending on how resources are looped back for reuse, circularity can be achieved through closed-loop or open-loop circularity (Farooque et al., 2019). Gonzalez-Sanchez et al. (2020) have clarified that circular supply chains involve both *closed-loop supply chains* that deal with the practice of returning products to the original manufacturer for reuse and *open-loop supply chains* that involve recovery of products and reuse by parties other than the original producer. A commonly quoted example of open-loop circular supply chain is Nike using pineapple leaves for sneaker production (Mitchell, 2021).

While there is a growing body of literature on circular supply chains, most are conceptual and qualitative, with a lack of comprehensive quantitative and analytical studies. The limited current modelling focusses mostly on closed-loop supply chains in manufacturing settings, which is significantly different from most agriculture business contexts. As such, this study proposes to fill the gap by providing a quantitative analysis of open-loop circular chains in the agri-food sector.

The Model

This study analyses and compares three scenarios, each of which corresponds to a different supply chain configuration and involves varying trade-offs for farmers and processors:

A supply chain with no circularity, that is, the traditional linear business model. In this case, agricultural by-products generated in the processing stages (e.g., grape seeds, skins, and pomace for a winery) are considered solely as wastes and of no value to the processor. The production decision and payoff are

characterized for the processor and farmers, considering consumers' purchasing behaviours and the resource costs. This serves as a benchmark case.

A closed-loop circular chain, where by-products are recycled and used in the original chain. For example, agricultural by-products are collected and converted into fertilizer for the farmers. The processor needs to decide whether to undertake recycling activities and initiate a circular supply chain, which requires additional investments and incurs an increased cost.

An open-loop circular chain, in which by-products are recycled, converted, and used in a secondary chain. For example, winery by-products such as grape seeds and pomace can be extracted and used for antioxidant, colorants and dietary fibre (Lavelli, 2021). This involves a separate processor that converts by-products into value-added products as inputs into a secondary chain. Interactions between the two supply chains are modelled regarding the incentives for the primary and by-product processors' participation.

Contributions and Implications

This work compares the three scenarios, analyses the interaction between farmers and the processors, and discusses their incentives to join or build circular supply chains. This provides practical guidance on motivating businesses to construct and enhance circularity. While most existing studies describe the circular supply chain archetypes as closed-loop versus open-loop and prescribe some solutions qualitatively, this work proposes to utilise an analytical modelling approach combined with empirical investigations, to conduct a quantitative investigation and provide a framework to enhance participation in alternative circular supply chain archetypes.

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Social Upgrading in Global Value Chains: The Mediating Role of Supplier Capability and Moderating Role of Relational Governance

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Introduction

A significant challenge that multinational enterprises (MNEs) global value chains (GVCs) face is managing sourcing relationships to eliminate evasive labor practices in suppliers' production facilities in developing countries. Fairness in buyer-supplier relationships has been suggested as an essential precursor for improved social practices along the supply chains (Oyedijo et al., 2023). Although social upgrading is critical for sustainable practices in GVCs, prior research examining social upgrading in GVCs remains scarce. Drawing from justice theory, we examine how the enacted perceived fairness and distributive fairness policies of buyers influence suppliers' commitment and capability corresponding to their social upgrading in GVCs. The findings of this research contribute to the collaborative governance practices of buyers and suppliers to achieve the desired level of social upgrading.

Literature Review

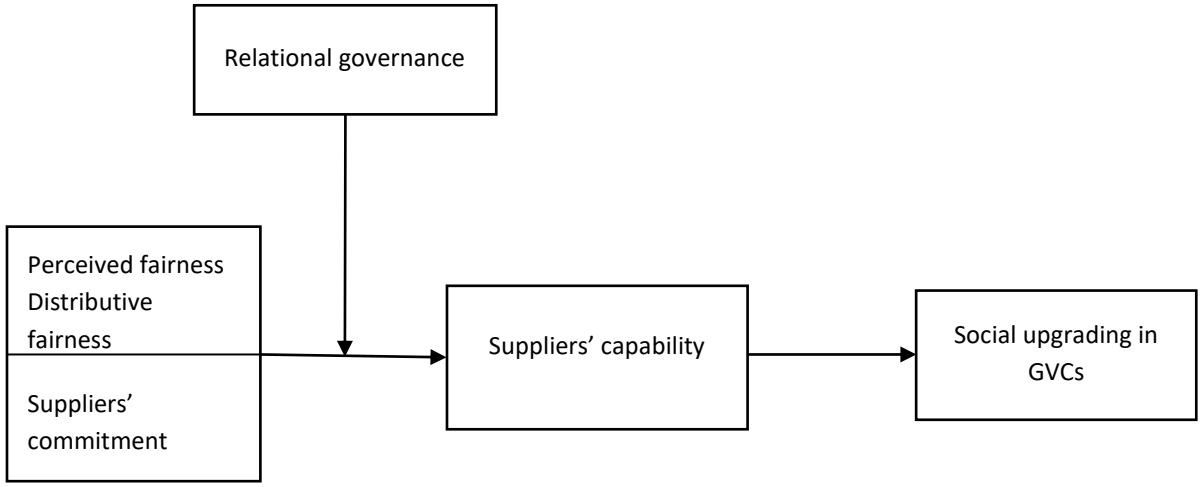
Globalization and rapid development of information and communication technologies (e.g., internet, telephone, container ship) facilitated MNEs in fine slicing their value chain activities. MNEs contract their value chain activities to suppliers in developing and emerging countries to exploit low labor costs to enhance their competitiveness. The spatial dispersion of MNEs' value chain activities has given rise to GVCs, a complex network of firms and other non-market actors that interact to create value for final consumers and markets (Islam & Chadee, 2021). Participation in MNEs GVCs has been argued to have positive spillover effects (e.g., knowledge, technology and valuable resources) on developing countries' economic development and economic upgrading, moving to higher value activities with improved technology, knowledge and skills (Epede & Wang, 2022; Gereffi & Lee, 2016). GVC research, for the last three decades, has increasingly focused on the interplay between governance (i.e., the rules of the game) and economic upgrading corresponding to MNEs' pursuit of higher efficiency.

However, there is a growing concern that economic upgrading is no longer sufficient for MNEs' sustainable global supply chain practices, given the widespread evidence of child labor, forced labor, discrimination, abuse and abysmal working conditions in suppliers' production sites in developing countries (Gereffi & Lee, 2016; Islam et al., 2017). Thus, social upgrading, defined as the process of improving the rights and entitlements of workers as social actors and enhancing of the quality of their employment (Barrientos, Gereffi, et al., 2011; Soundararajan & Brown, 2016), has attracted considerable attention by researchers, policymakers and multilateral donor organizations (Gereffi & Lee, 2016). The burgeoning literature on GVCs has focused on MNEs' corporate governance strategies' role in enforcing better social upgrading practices along the supply chain (cf. Alexander, 2020). In contrast, multilateral research initiative such as 'Capturing the Gains' supported by the International Labour Organization (ILO) has focused on exploring the synergistic effects of private (e.g., corporate codes of conduct), public (e.g., government policies and regulations) and social governance (e.g., social pressures on businesses from non-government organizations, civil society) on social upgrading practices in supplier firms in developing countries (Barrientos, Mayer, et al., 2011; Gereffi & Lee, 2016). In this vein, supply chain and other cogent business-management literature have focused mainly on the influences of transactional (i.e., contractual) and collaborative (i.e., relational) governance approaches on fairness perception and its impact on social performance (cf. Alghababsheh et al., 2020; Oyedijo et al., 2023) or performance in general (Griffith et al., 2006; Liu et al., 2012).

Notwithstanding the value of past research, we have little understanding of how network-level resources accrued from buyers' fairness treatment and collaborative governance approach accelerate suppliers' commitment to developing the capability to enhance their social upgrading in GVCs. Underpinned by justice theory, we develop a framework to argue that the interplay between buyers' fairness treatment, collaborative governance approach and suppliers' commitment create an environment conducive to

suppliers' capability development, influencing the suppliers' social upgrading practices in GVCs. Figure 1 presents our conceptual framework that posits that perceived fairness, distributive fairness and suppliers' commitment are essential precursors to the suppliers' capability development, and these relationships are moderated by relational governance, which influences social upgrading practices in GVCs.

Figure 1: Conceptual model of environmental and social upgrading in GVCs.



Method

This research employed an online survey using a structured questionnaire to collect the data to test the model presented in Figure 1 and associated hypotheses. The data for this research was collected from top-level and mid-level managers of apparel supplier firms in Bangladesh towards the end of 2022. Excluding incomplete responses, speeder and outlier cases, 345 responses were retained for final analysis.

Findings

The results of hypothesis testing largely support our theoretical contention that supplier capability is a significant intervening mechanism to transform the benefits accrued from the interplay between network-level resources that emerged from perceived fairness, distributive fairness and relational governance, and internal commitment for social upgrading in GVCs.

Contributions and Implications

The findings of this study show that buyers' perceived and distributive fairness policies and suppliers' commitment enhance the suppliers' capability development that transforms the benefits accrued from fairness treatment into social upgrading contingent on relational governance. These findings imply that managers of MNEs need to proactively devise fairness policies along with a collaborative governance approach to bolster suppliers' commitment and capability development. Moreover, the managers of developing country suppliers need to proactively commit resources and time to develop their internal capabilities instead of relying solely on network-level resources for enhancing their social upgrading performance. The results of this study contribute to the limited research on social upgrading in GVCs.

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Blockchain technology for Agri-food supply chain sustainability: A systematic literature review

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1. Introduction

Blockchain technology (BCT) adoption for food supply chain sustainability is increasingly receiving attention. However, systematic literature review (SLR) has been under-studied, specifically in the agri-food supply chain sustainability context (Sharma et al., 2020). Evidence shows that the potential of BCT may enhance agri-food supply chain sustainability, but SLR is relatively limited (Kummer et al., 2020). Thus, this paper aims to conduct a systematic literature review on BCT for Agri-food supply chain sustainability (AFSCS).

In the globalised food supply chain, food quality and safety are significant to ensure agri-food supply chain sustainability (Kummer et al., 2020). To do so, there is a need for secure information-sharing architecture across the agri-food supply chain (Yadav and Singh, 2020). AFSCS is vital in ensuring food security and hunger elimination globally (Sharma et al., 2020). Due to the rising incidence of food contamination, food security, quality, and safety are gaining attention around the globe (Casino et al., 2020). In such an environment, there are deep concerns about enhancing the operational efficiency of agri-food supply chain management through secure information sharing to ensure sustainability (Sharma et al., 2020). To this end, secure information sharing is one of the leading tools for reducing opportunism and information asymmetry in agri-food supply chain management (Wong et al., 2020). It (secure information sharing) could improve operational efficiency and effectiveness across the food supply chain. To do so, blockchain technology (BCT)- a peer-to-peer network/database/ledger that has the potential to enable secure information sharing for the agri-food supply chain (Kamble et al., 2020a, Roeck et al., 2020, Bai and Sarkis, 2022). The application of blockchain in the agri-food supply chain could enhance economic, social, and environmental benefits to ensure sustainability (Tian and Sarkis, 2020).

The remainder of the paper is structured as follows. Section two outlined the underlying research background of this study through a literature review, outlined various blockchain adoption drivers in the supply chain, and provided a conceptual framework. The literature review highlights key concepts of the study, including supply chain and BCT adoption in the agri-food supply chain (see Appendix 1). The study's methodology and the method are outlined in Section Three. The expected contribution of the study is outlined in Section Four. Finally, Section Five provides a discussion and conclusion of the study.

2. Literature review

Blockchain adoption in SC: Blockchain adoption has recently received attention in supply chain activities. The potential of blockchain adoption in the supply chain is expected to enhance the traceability (Garcia-Torres et al., 2019, Hastig et al., 2020), transparency (Bai and Sarkis, 2020, Kshetri, 2018), trust (Kamble et al., 2019, Howson, 2020), sustainability (Manupati et al., 2020, Garcia-Torres et al., 2019, Kouhizadeh and Sarkis, 2018) and enable disintermediation (Saberi et al., 2019). Influenced by the potential of adoption, practitioners and academic scholars seek to exploit and assess these potentials in supply chain practices (Kamble et al., 2020b, Queiroz et al., 2019).

Blockchain adoption in Agri-food SC: Blockchain adoption in the agri-food supply chain is considered a new quality index in the food industry (Casino et al., 2020). For example, Feng et al. (2020) argue agri-food supply chain needs to become more traceable and sustainable to provide food quality and safety to consumers. Many food quality and safety issues have been seen worldwide in recent years. For example, Europe's ongoing meat adulteration scandal brings food quality and safety concerns (Boyacı et al., 2014). ‘‘Horsemeat is alternatively used instead of beef due to lower raising costs’’ (Boyacı et al., 2014, p,1). In China, food safety scandals are more frequent and severe problems (Tian, 2016).

The extant literature reviews focus on the comprehensive analysis of blockchain from various perspective (Tapscott and Tapscott, 2017, Gatteschi et al., 2018, Ryan, 2017). In contrast, these reviews paved the way for blockchain technology for different industries in the supply chain (Hofmann and Rüsch, 2017, Manski, 2017, Kshetri, 2017). There are papers on drivers, barriers, outcomes or benefits (Gurtu and Johny, 2019, Hughes et al., 2019). However, few studies empirically investigate different variables relating to blockchain adoption in the agri-food supply chain (Aung and Chang, 2014, Salah et al., 2019, Behnke and Janssen, 2019). In this regard, they do not empirically investigate the blockchain adoption driver (business environmental) for SC traceability and sustainability for the agri-food supply chain, specifically for Australian Agri-products. Therefore, this research has significant value to the literature.

2.1. Drivers of BCT in AFSC

Based on an extensive literature review, this research emphasizes testing blockchain adoption drivers (technological, organizational, business environmental) for supply chain traceability and sustainability: considering the mediating role of traceability in agri-food supply chain sustainability. The following section provides all drivers and the measurement items for the constructs of the study.

2.1.1. Technological drivers

Technological drives, such as internal and external technologies related to organisations, are currently used in the firm and are available in the current marketplace (Baker, 2012). In this study, the technological driver consists of four measurement items: technology readiness, relative advantage, compatibility, and trialability.

2.1.2. Organizational drivers

Organisational drivers refer to current internal resources and opportunities that organisations capable of adopting new technology. Therefore, adopting a new technology organisational driver plays an essential role. This study consists of three measurement items concerning organisational drivers: top management support, organisational readiness, and technological knowledge. The organisational drivers and associated measurement items provide in the following section.

2.1.3. Business environmental drivers

Business environmental drivers refer to current internal and external pressure/ influences on organisations to adopt new technology in the changing marketplace. Concerning business environmental drivers, this study consists of five measurement items: competitive pressure, Government support, regulatory support, stakeholder influence, and market dynamics. The business environmental drivers and associated measurement items provide in the following section.

2.1.4. Social drivers

Social drivers refer to social influence on organisations to adopt new technology to meet stakeholders' social requirements in the changing business environment. Concerning social drivers, this study consists of two measurement items, including cultural influence and social influence. The social drivers and associated measurement items provide in the following section.

Culture influence refers to beliefs, values, symbols, and assumptions that outline how a firm undertakes its business in a particular cultural environment in the volatile marketplace.

Social influence refers to compliance with the ethical requirements of social commitments relating to adopting blockchain in a rapidly changing environment for organisations. The social issues cover vast areas, including Child labour, rural poverty trap, Fair Trade, prosperous local economy and community, standard of living, resource rights, CSR scrutiny and accountability, human rights abuse, conflict resource, circular economy, developing-country exploitation (Hastig et al., 2020). To this end, social influence is vital in blockchain adoption in SCs in the changing business environment. Blockchain adoption drivers and measurement items for this research presented in the following Table 2:

Table 2 Blockchain adoption drivers and measurement items

Drivers	Measurement items	Sources
D1: Technological Drivers	Technological Readiness Relative Advantage Compatibility Trialability	Chang et al. (2008), Fosso Wamba et al. (2016), Wang et al. (2010)
D2: Organizational Drivers	Top Management Support (TMS) Organizational Readiness (OR) Technological Knowledge (TK)	Nayak and Dhaigude (2019), Wong et al. (2020), Wang et al. (2010)
D3: Business Environmental Drivers	Competitive Pressure (COMP) Regulatory Support (REGS) Stakeholder Influence Market Dynamics (MARD)	Kouhizadeh and Sarkis (2018), Min (2019), Li et al. (2020), Queiroz and Wamba (2019), Kamble et al. (2019)
D4: Individual Drivers	Awareness of technology (AWAT) Technological Novelty Seeking (TNS) Expectation of Benefits (EB)	Behnke and Janssen (2019) Min (2019), Kamble et al. (2019) Saberi et al. (2019b)
D5: Social Drivers	Culture Influence (CULI) Social Influence (SOCI)	Pournader et al. (2019) Rantala et al. (2018)

2.1.5. Conceptual framework

Based on the reviewed papers, Figure 1 shows a conceptual framework of blockchain adoption for AFSCS. This study will explore BCT adoption for agri-food supply chain sustainability for supply chain management. This research will specifically focus on blockchain adoption for three drivers, such as technological, organisational and business environmental for the food SC in general and agri-food SC in particular.

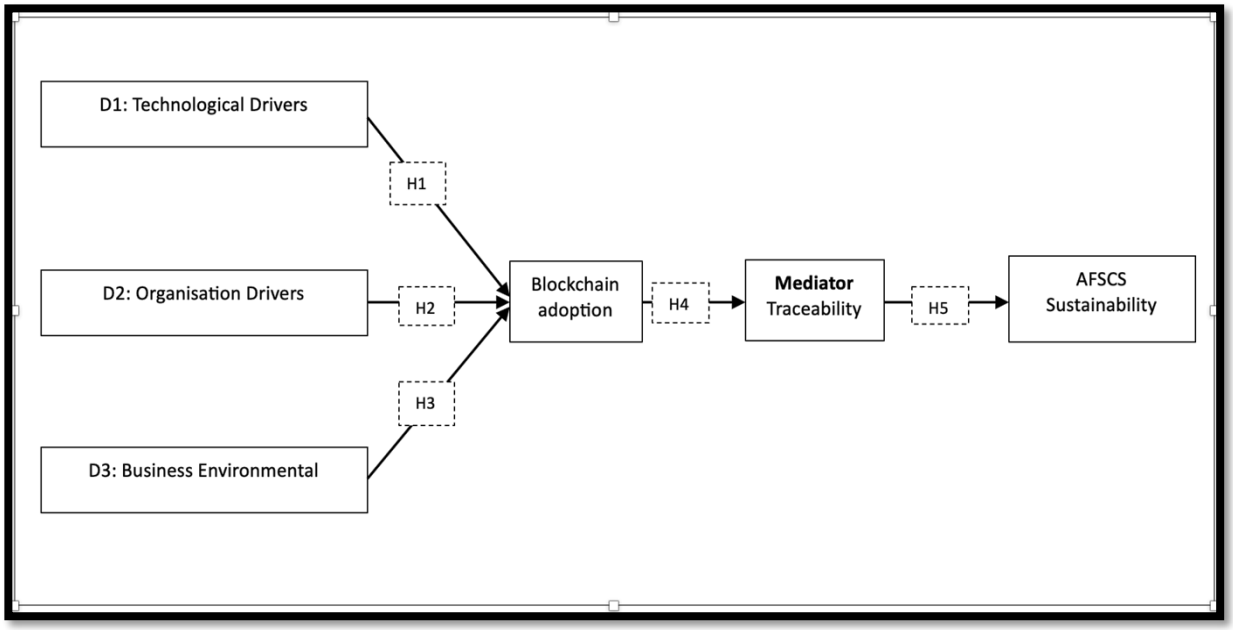

Figure 2. A conceptual framework for BCT adoption for AFSCS

3. Methodology

The following section provides the research methodology for this study. This study adopted a systematic literature review as a research methodology following Tranfield et al. (2003) five steeps method. This study adopted a SLR methodology to identify relevant articles from peer-reviewed scholarly journals following appropriate inclusion and exclusion criteria. It employed a systematic searching method, an appropriate search string (agreed with authors' team), keyword search, and search terms to identify articles/resources from multiple databases for the study, resulting in 210 articles. Finally, 52 peer-reviewed articles are included for this study to review. The time frame is considered from 2014 to date.

3.1. Search criteria

Blockchain technology for agri-food supply chain sustainability is in the early stage of the research. For instance, before 2014, there were no article found relating to the theme of the study through the article search. The inclusion and exclusion criteria have been used for the article search for this study shows in the following Table 2.

Table 3 Inclusion and exclusion criteria

Inclusion	Exclusion
Year of publication: From 1st January 2014 to 31th July 2023	Any publication before 1st January 2014 and after 31th July 2023
Databases: Scopus, Google Scholar, ProQuest ABI/INFORM Collection, and Web of Science	Other databases (produce similar output)
Journal type: Peer-reviewed, full text	Online sites and grey literature (conferences, reports, working papers from research groups, technical reports)
Source type: Scholarly journal	
Document type: Articles	
Language: English	Any other languages
Journal articles only	Books, conference papers, industry reports

Search String (used for the study) (Blockchain* OR "distributed ledger" OR "smart contract") AND ((food* OR agriculture* OR "agri-food") AND ("supply chain" OR logistics* OR source* OR procur* OR purchas* OR manufactur* OR operat* OR distribut*) AND (sustainability* OR sustainable* OR sustain* OR green*))

4. Expected contribution

This study may assist decision-makers in managing BCT adoption in the agri-food supply chain and the potential uses of the blockchain to enhance Agri-food supply chain sustainability. The study's result indicates that among the other advantages (auditability, immutability, and provenance), traceability is one of the significant advantages of BCT for AFSCS. The study's findings will help the practitioners map the BCT adoption procedure in SC for creating a real-time AFSC.

5. Discussion

This study presents a SLR on blockchain technology for Agri-food supply chain sustainability. Although blockchain adoption in the agri-food supply chain is in its early stage, however, this study identified various drivers that influence blockchain adoption in the food supply. Among the many drivers, technological, organizational, and business environmental drivers play a leading role in BCT adoption for AFSCS.

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Pathways to marine plastic waste recycling in Australia

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This paper explores the drivers of marine plastic waste accumulation in the Australian coastlines and the pathways of marine plastic waste recycling process and potential outputs suitable for use in different production sectors. The study develops a system dynamic simulation model employing mixed methods combining both qualitative and quantitative analysis. The quantitative analysis has been done using historical data on plastic usage and plastic waste generation, while the qualitative analysis has been undertaken by conducting in-depth semi-structured interviews with experts and stakeholders of the plastic recycling industry involved in marine plastic waste collection and recycling process. The research follows the system dynamic approach within the theoretical framework of circular economy (CE) and sustainability, where triple bottom line concepts of economic, social, and environmental sustainability and the principles of circular economy, '3Rs'- reduce, reuse and recycle of marine plastic wastes are addressed. The literature suggests for various recycling methods and technology for the conversion of different categories of plastic wastes, for example, recycled polyolefin waste can be converted into a range of valuable products, such as clean fuels, naphtha (a combination of hydrocarbons), polymers etc. The research anticipates economically viable and socially and ecologically sustainable recycling pathways for the marine plastic wastes accumulated on the Australian coastlines. As such, the study will contribute to the Australian Government's current policy on the plastic waste export ban and enhanced recycling capacity building and prospective investment strategies to control plastic pollution and increase the usage of recycled plastics in different industrial sectors.

The Role of Agricultural Biomass and Bioenergy in Decarbonising Supply Chains

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Note: Authors' have requested not to publish the content of the research (in any form) to comply with the University requirements.

SUPPLY CHAIN AND LOGISTICS MANAGEMENT

Cyber Insurance as a Risk Mitigation Strategy in Digital Supply Chains

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Introduction

In an increasingly interconnected and digitalized world, supply chain management's complex and multifaceted realm is navigating various challenges, with cyber risks ascending the hierarchy of pressing issues. While the general topic of supply chain management has been exhaustively studied, the more specific focus on the intersection of cyber risks and supply chain vulnerabilities has yet to receive the comprehensive analysis it warrants. The relevance of this specialized concern is magnified by real-world occurrences such as the Maersk Global Supply Chain Meltdown, which served as a cautionary tale that illuminated the vulnerabilities inherent in global logistics and trade operations and demonstrated the need for robust risk mitigation strategies (Cyberattack: The Maersk Global Supply Chain Meltdown, 2023). The event underscored the dire need for fortified risk mitigation strategies to withstand the multi-pronged cyber vulnerabilities. This study endeavors to fill this gap in both academic and practical dimensions, aiming to offer an exhaustive, multi-layered examination of the interplay between cyber risks and supply chain vulnerabilities (Ghadge et al., 2020).

Literature Review

The study of supply chain management has been a focal point of academic and industry research for years, with primary focus areas ranging from efficiency optimization and logistics (Fan & Stevenson, 2018) to resilience against various forms of risks like natural disasters, geopolitical instabilities, and economic fluctuations (MacCarthy et al., 2022). These studies offer robust frameworks for understanding the intricacies of modern supply chains but largely neglect the rising importance of cyber risks, especially in an age where supply chains are increasingly digitalized. While traditional vulnerabilities such as manufacturing delays, transportation disruptions, and trade tariffs are well-documented, cyber risks have received comparatively less scholarly attention (Bartol, 2014; Boyson, 2014). This neglect is alarming, considering the ramifications of recent cyberattacks on supply chains, which have caused catastrophic failures, data losses, and financial damages. The notable shortfall in the literature is evident in its limited scope, often addressing cyber risks as a mere footnote rather than a subject demanding focused scrutiny.

One under-investigated area within the realm of cyber risks and supply chain management is the potential of cyber insurance as a mitigation strategy. Although insurance options have been generally discussed as risk transfer mechanisms in supply chain management (Keegan, 2014), the discourse on their applicability to specifically counter cyber risks remains largely unexplored (Marotta et al., 2017). Questions remain about the efficacy of cyber insurance policies, their coverage, and the ethical and practical complexities they introduce. The available literature identifies the components of the issue but fails to link them into a cohesive narrative or framework that comprehensively addresses cyber risks in supply chains. Few studies have ventured into the intersectionality between cyber risks, supply chain vulnerabilities, and the role of cyber insurance. This creates a fragmented understanding that cannot be efficiently applied in a practical setting, thus underscoring the need for a more holistic approach.

Methodology

To address this gap, the study employs a qualitative research design. It builds upon a systematic review of academic articles (Ghadge et al., 2012; Louis & Pagell, 2019), expert interviews, and organizational reports. Real-world case studies are included to enhance contextual understanding, supplemented by secondary data analysis. The methodology ensures rigorous examination and fills the existing knowledge chasm.

Findings

This paper goes beyond merely confirming existing knowledge; it identifies and addresses significant gaps in the current literature (Colicchia et al., 2019; Creazza et al., 2022). One ground-breaking aspect of this research is its focus on the role of cyber insurance. It interrogates the efficacy and limitations of insurance as a component in broader organizational risk management strategies (Böhme & Schwartz, 2010; Eling et al., 2022). Importantly, our findings show that while cyber insurance can be effective for covering financial losses, it may not provide a complete solution for reputational damage or the loss of intellectual property. This nuanced understanding suggests that cyber insurance should not be considered a standalone risk mitigation strategy but should be integrated into a broader framework. It opens avenues for exploring sector-specific vulnerabilities and recommends cross-disciplinary approaches integrating technological, managerial, and policy perspectives for more holistic risk mitigation strategies. By addressing these aspects, our study responds directly to gaps in the literature identified by Colicchia et al. (2019) and Creazza et al. (2022). The exploration into the role of cyber insurance, sector-specific vulnerabilities, and the integration of multiple disciplines in risk mitigation not only broadens the current scope of understanding but also opens new avenues for future research.

Implications

The implications of this research are manifold. Academically, it establishes a foundational bedrock for future inquiries into cyber risks within supply chain management. Practically, it offers actionable strategies and policy recommendations for industry professionals (Al-Ansari & Alsubait, 2022; Cheung et al., 2021).

This paper establishes itself as a seminal work in the field by synthesizing existing knowledge, identifying gaps, and offering actionable strategies and policy recommendations. It serves as a comprehensive guide for future research trajectories. It lays down a blueprint for industry action, equipping academics and practitioners with the tools to counteract the increasingly intricate and challenging landscape of cyber risks in supply chain management. In sum, this study aims to become an indispensable resource for a field that urgently needs theoretical depth and practical solutions to address the ever-growing challenge of cyber risks.

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Evaluating a Supply Chain Collaboration Framework through A Case Study

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In light of the enduring repercussions stemming from the global pandemic, the competitive landscape of the global marketplace has intensified significantly. The pronounced fluctuations in various cost components, encompassing logistics, raw materials, and labour, alongside the prevailing uncertainty pertaining to military and political conflicts and the overall instability of the global economy, have underscored the criticality of Supply Chain Collaboration (SCC). Consequently, the studies of SCC practices among practitioners have gained substantial significance, offering valuable insights and lessons. The NEXT Federation (NF) is a New Zealand-based nonprofit, non-governmental organisation (NGO) with a focus on SCC and industrial collaboration practices. Over the past seven years, NF has initiated 127 SCC projects and successfully completed 71 of these projects. A few of the most successful projects garnered significant media attention, including coverage by prominent Chinese national-level news outlets. These projects also achieved noteworthy online engagement. One in particular had concurrent viewers of 1.82 million. Drawing from NF's extensive practical experience and insights, NF has formulated the GMABC (Government Media Academy Business and Community) SCC model. This model serves as a conceptual framework for presenting best practices and ongoing SCC initiatives with a global reach. This qualitative exploratory case study begins with evaluating the GMABC model through a comprehensive review of the existing SCC literature. Subsequently, an analysis of NF's data, encompassing project reports and supporting documentation, will be conducted to validate and refine the GMABC model. Based on the outcomes of the data analyses, expert interviews and a survey involving participants in NF's SCC projects will be conducted for the further refinement of the GMABC model. Utilising the refined model, this research will identify the value proposition of NF's SCC practices from diverse perspectives, including governmental, media, academic, industrial, and community stakeholders. This value proposition will encompass two dimensions. First, the value delivered to all SCC stakeholders aligns with NF's SCC goals. Second, the desired values of SCC stakeholders not fulfilled by NF's practices. Building on this value proposition, the study will elucidate the advantages of NF's current SCC practices and identify challenges and issues. Furthermore, this case study will provide recommendations in the form of a framework for NF's SCC practices, informed by the well-established Zachman's framework. This SCC framework will offer guidance and theoretical foundations for NF to continue, enhance, and leverage its SCC initiatives. From practical and academic perspectives, this research study makes contributions through its holistic and comprehensive viewpoint on the SCC practices and initiatives. It will potentially induce future research on the implementation and validation of the refined GMABC model and the application of the SCC framework developed in this study.

Requirements Management for Tailoring Digital Transformation in Australasian Public Mental Health

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Digital transformation (DT) is widespread in most industries today. However, there is a paucity of literature to guide DT in the mental health context, resulting in a need to identify the critical capabilities required to enable DT along with supporting Information Systems (IS). This research gap is particularly evident in the context of Australasian public mental health. Key IS for clinical care delivery, and the DT process, in the mental health context are the widely used electronic health record (EHR) systems. Work is needed to ensure that EHR systems support clinicians in a way that does not overburden them with an excessive time commitment to complete EHR input requirements rather than actual patient care. It has been shown that the burden associated with using EHR systems is a critical issue for clinicians and is potentially contributing to their burnout. Furthermore, relevant research to date appears to address EHR-related burdens for clinicians in the US context, with little incipient evidence from other countries. Considering each country has somewhat different practice and clinical requirements, the factors and impact of the EHR burden in various settings are likely to be different. Hence, there is a demand to examine better-designed EHR systems, particularly for the Australasian public mental health environment. It has been reported that after several rounds of digitisation in an Australasian public mental health environment, clinicians were required to perform an increasing number of non-value-added activities when engaging with the EHR system. Nurses are one of the primary end-users of EHR systems. This engagement with the HER system resulted in an increased workload for the already overworked nurses, which directly increased their risk of burnout, excessive stress, and poor well-being. Ultimately exacerbating the chronic nursing shortage situation. Severely constrained by limited resources and the lack of expertise in IS, mental health environments have difficulty in achieving successful DT of their service operations. In this proposal, we advocate a requirements management process to be utilised as a guideline for tailored DT. This process elevates nurses to the position of a critical stakeholder recognising them as key contributors to requirements gathering as well as key users. Because nurses have a profound understanding of clinical care processes and the subsequent EHR system support requirements. An exploratory case study involving a publicly funded Australasian mental health entity is proposed. This case study, with a focus on EHR systems and their impact on nurses as a key user group, will delve into the urgent need for a requirements management process that raises the voice of nurses in EHR system development. A mixed-method research approach will be adopted involving semi-structured interviews with management, clinicians and IS developers followed by a survey. It is proposed that established requirements management principles will be identified from the literature and real mental health requirements gathering practices. In addition, based on the findings of the research, recommendations will be made for the enhancement of the requirements management process so that it captures the voice of the primary clinical uses of the EHR systems, which in this case are the mental health nurses.

Inter-organisational Team Identification and its Influence on Logistics Outsourcing Collaboration

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Introduction

Triggered by the fierce competition and substantial changes in worldwide markets during the past two decades, an increasing number of firms have adopted a logistics outsourcing strategy to maintain core competencies and gain competitive advantages. Accordingly, the relevant research has achieved both practical and academic attention, ranging from the type of logistics activities outsourced, the motivation for such operations, and the positive and/or negative results of the actions. Nevertheless, considerable opportunities remain for further exploration, especially in logistics outsourcing relationship management (LORM). In this research context, the study links with recent calls to extend LORM research into human factors and behaviour SCM (e.g. Gligor & Autry, 2012; Gligor & Holcomb, 2013; Grawe et al., 2015; Schorsch et al., 2017), as well as multilevel interaction that calls for meso-level theories in LORM (e.g. Grawe et al., 2014), and recent calls for multi-disciplinary investigation of LORM (Daugherty, 2011). Extending the traditional LORM research into inter-organisational team identification (IOTI) field, this study investigates and justifies how and to what extent IOTI of boundary spanning employees (BSEs) affected team effectiveness and, ultimately, inter-organisational performance within the context of the logistics outsourcing industry.

Literature Review

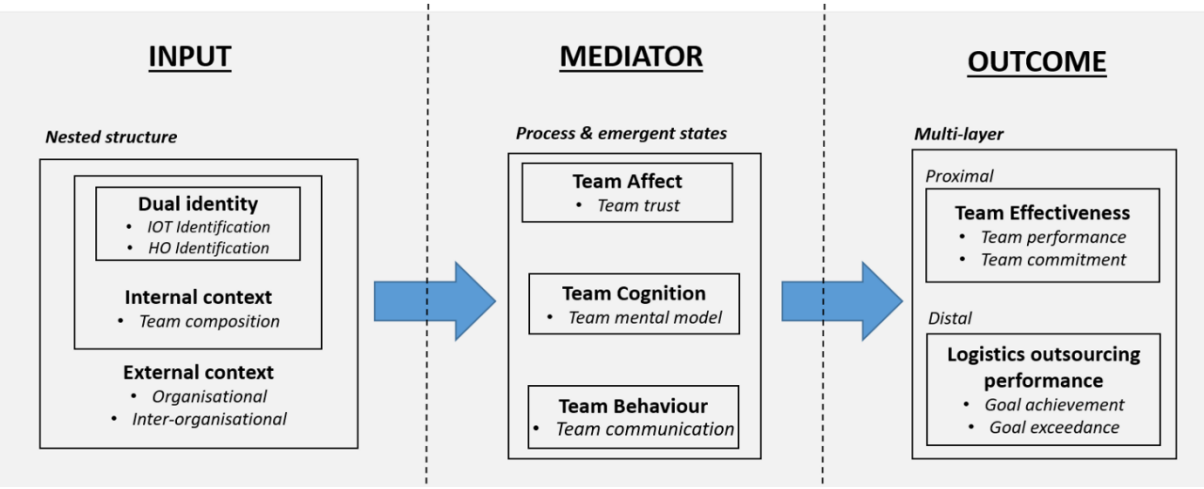
In recent years, LORM has received considerable attention (refer to the literature reviews by Aguezzoul, 2014; Daugherty, 2011; Maloni & Carter, 2006; Marasco, 2008). Notably, a few relevant topics also draw particular attention, including supply chain risk management (König & Spinler, 2016; Manuj et al., 2014), relationship sustainability and loyalty (Cahill et al., 2010; Kudla & Klaas-Wissing, 2012) and knowledge management and innovation (Grawe et al., 2015; Wagner & Sutter, 2012). Furthermore, it is gradually recognised that if outsourcing relationship is not clearly defined and practiced logistics outsourcing can threaten corporate failure and disappointment (Qureshi et al., 2007). More specifically, individual behaviour and interpersonal relationships, i.e., human factors, are becoming increasingly critical in managing a successful logistics outsourcing relationship (Daugherty, 2011).

Fulmer and Gelfand (2012) indicated that interpersonal relationships facilitate interfirm communications. Expanding to a more extensive scope, Gligor and Holcomb (2013) further explored how interpersonal relationships between LSPs and their customers influence behaviour. However, the human factors involved in the interaction between LSPs and their customers still lack sufficient research. Therefore, it is important to acknowledge the weakness in the extant logistics outsourcing research and recognise the pivotal role of social elements in the relationship (Gligor & Holcomb, 2013). In the extant literature on SCM, there is consensus that both team identification and organisational identification lead to a significant number of behavioural and psychological consequences (Robinson et al., 2018). Likewise, it is reasonable to derive that IOTI directly or indirectly influences interorganisational behaviours and processes and ultimately drives collective performance.

To expand the knowledge of logistics outsourcing relationship management. this study aims to fulfill the objectives of:

- **Description:** to provide a detailed account of the relationships between team identification and team effectiveness under the scenarios of inter-organisational collaboration.
- **Exploration:** to develop an understanding of such relationships and relevant elements from boundary spanning perspective in the context of the logistics outsourcing industry.
- **Explanation:** to establish and test the mechanisms responsible for such relationship' effectiveness.

Finally, this study develops the conceptual framework below.



Method

The study adopted the reasoning approach of an exploratory sequential mixed method (Creswell & Clark, 2018), including four phases of data collection and analysis: first, the research model was conceptualised by a comprehensive literature review; second, a qualitative study (semi-structured interviews) was used to validate the findings of literature review and gave insights to the development of both conceptual model and measurement scales; third, a survey was conducted to obtain data related to the variables in the model; finally, a quantitative analysis based on Structural Equation Modelling (PLS-SEM) and PROCESS macro approach was implemented to test the research hypotheses.

Findings

Based on the theoretical background of social psychology and the conceptual framework, the research questions and associated hypotheses were proposed and the findings was clarified as below:

IOTI does not directly affect team effectiveness but there are mediated relationships between IOTI and team effectiveness with variables in aspects of team affect, cognition and behaviour;

Home organisation identification (HOI) moderated the relationship between IOTI and Team behaviour variable;

HOI does not moderate any mediated relationship between IOTI and team effectiveness;

Team performance has a significant direct influence on logistics outsourcing performance .

Overall, this section has interpreted the research results achieved from qualitative interviews and quantitative analysis. Supported by the relevant theories and previous empirical studies, the findings of this study have presented some novel findings on IOTI and boundary spanning phenomenon.

Contributions and Implications

Overall, the present study provided insights into the influence of IOTI on team functioning in the logistics outsourcing industry. Meanwhile, it developed a theoretical framework to analyse and explain a range of phenomena regarding group-level psychological mechanisms. Lastly, the findings from the study provided theoretical and practical implications to academic researchers and industry practitioners.

<u>Theoretical implications</u>

this study developed arguments based on three theories that have never been used in the study of LORM: Social Identity Theory (Tajfel, 1978), Self-Categorisation Theory (Turner et al., 1988) and Common Ingroup Identity Model (Gaertner et al., 1993). Introducing this innovative reasoning approach allowed researchers to understand the phenomenon of logistics outsourcing collaboration from a boundary-spanning perspective. By meaningfully extending the work on team identity and inter-organisational relationships, this study also broadened the basis for further study of IOT and LORM.

Second, this study extended our understanding of LORM in a novel perspective with multiple considerations on micro-foundations, meso-level interactions, and inter-organisational relationships. Combining both qualitative and quantitative data, the present study provided the first empirical test of the meso-level perspective of exploring personal issues (IOTI) in the SCM context.

Last, this study initiated and tested a comprehensive framework comprised of three mediating mechanisms to explain the association between IOTI and effectiveness. Meanwhile, the framework also considered contextual factors (moderating or contingent) that may exert influence on the linkages involved. In such a comprehensive way, this study successfully developed the knowledge needed to design interventions that modify mediating mechanisms and improve IOT effectiveness and logistics outsourcing performance.

Practical implications

First, because IOTI is supposed positively affect IOT effectiveness, managers should be aware of factors that influence it in inter-organisational contexts. Knowing that BSEs' effect, behaviour, and cognition potentially contribute to a higher level of logistics outsourcing performance, managers should actively cultivate and maintain IOTI in dual group membership settings.

Furthermore, when setting up and staffing an IOT, managers should be mindful of employees' prior experience working together, i.e., each individual's satisfactory or negative experience with certain colleagues. At the same time, it is also crucial to consider the prior coordinating experience of own employees with BSEs from the customer firm. Managers should reconfigure the team whenever needed to avoid contamination of current IOT coordination and further strengthen inter-organisational relationships.

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Barriers to Sustainable Operations: Insights from Apparel Manufacturing in Developing Countries

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Assuring the sustainability of operations is an undeniable reality for organisations given their detrimental impact on the social and natural environment. Rather than engaging in unrelated and irrelevant sustainability initiatives, organisations are now compelled to generate sustainable value for all stakeholders through their daily operations. As such, given the reported organisational failures, this study investigates internal organisational barriers to embed sustainability into operations by specifically focusing on apparel manufacturers in developing countries, thus helping these organisations to have sustainable operations. Data collected using interviews and published documents adopting multiple case study design explored four barriers, which are 'lack of positive perception and understanding', 'sustainability not as a strategic priority, 'uncooperative managerial and structural arrangements', and 'conflicts with profitability'. These findings illuminate the understanding of restraining factors specific to apparel manufacturing that impede their sustainability performance. They serve as insights to their decision-making, enabling them to allocate resources effectively to avoid or mitigate challenges to become genuinely sustainable.
Keywords: Embedding sustainability, Barriers, Apparel, Developing countries

SUPPLY CHAIN RESILIENCE

Supply Chain Resilient Farming Systems

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Introduction

Supply chain resilience is important in the farming systems for several reasons: climate change and extreme weather; market stability; food security; supply chain disruptions; and adaptation to changing consumer preferences. There are four objectives of this research as follows to investigate the vulnerabilities within the existing supply chain for agricultural products, including potential disruptions and risks associated with climate change, natural disasters, market fluctuations, and policy changes; to identify key indicators that can measure the resilience of farming systems within the supply chain. These indicators may include production capacity, resource availability, adaptive capacity, financial stability, and social factors; to explore and develop risk management strategies to mitigate disruptions in the supply chain. This can involve evaluating alternative production methods, diversifying sourcing and distribution networks, establishing contingency plans, and implementing early warning systems; and to examine sustainable resource management practices within farming systems to enhance their resilience. This can include exploring methods for efficient water use, soil conservation, crop diversification, integrated pest management, and renewable energy adoption.

Literature Reviews

Resilience is a critical element in entrepreneurial crisis management since it helps understand how organizations adapt to or resist change (Walker et al., 2004). The concept of resilience was first introduced in ecological literature (Holling, 2001) and has developed in the business context through the growth of a heuristic model based on complex systems and viewed as an adaptive cycle (Salvia & Quaranta, 2015). According to Walker et al., (2004), resilience refers to the capacity of an entity to accommodate change and reorganize while preserving the same functionality, structure, identity, and feedback. Supply chain resilience is developed using the foundations of many disciplines, including risk management (Starr et al., 2003; Wagner & Bode, 2008) and network theory (Callaway et al., 2000). In this paper, we will conduct comprehensive literature reviews to gather existing knowledge and insights related to supply chain resilient farming systems. This method helps identify gaps in the current understanding and provides a foundation for developing research questions and hypotheses.

Research methods

In our proposed research, we are going to do several research methods.
Surveys and Questionnaires: Design and administer surveys or questionnaires to collect data from farmers, suppliers, processors, distributors, and other stakeholders in the supply chain. This method can provide insights into their perceptions, practices, challenges, and needs related to supply chain resilience in relation to climate change.

Interviews and Focus Groups: Conduct interviews or organize focus groups with key stakeholders to gather in-depth qualitative data. This method allows for a deeper understanding of their experiences, decision-making processes, and perspectives on supply chain resilience / climate resilience.

Case Studies: Conduct detailed case studies of specific farming systems or supply chains to explore resilience strategies, challenges faced, and lessons learned. This approach provides a comprehensive understanding of real-world contexts and allows for an in-depth analysis of specific factors influencing resilience.

Data Analysis: Analyze existing data sets, such as agricultural production data, climate data, market data, and supply chain performance metrics. Statistical analysis and data mining techniques can be employed to identify patterns, trends, and relationships related to supply chain resilience.

Econometric Analysis: Use econometric techniques to analyze the economic aspects of supply chain resilient farming systems. This method can help assess the economic impact of resilience measures, evaluate the cost-effectiveness of different strategies, and quantify the potential benefits and returns on investment.

Expected Outcomes

Enhanced Supply Chain Stability: One of the primary expected outcomes is an increased stability and reliability of the agricultural supply chain. Resilient farming systems can help minimize disruptions caused by factors like extreme weather events, market fluctuations, and logistical challenges, ensuring a consistent flow of products from farm to market.

Improved Risk Management: Supply chain resilient farming systems aim to identify and manage risks effectively. As a result, the expected outcome is improved risk management practices, including early warning systems, contingency plans, and strategies to mitigate potential disruptions. This outcome helps farmers and stakeholders navigate uncertainties more effectively.

Increased Adaptive Capacity: Resilient farming systems focus on building adaptive capacity to respond and adapt to changing conditions. Expected outcomes include improved flexibility, agility, and responsiveness within the supply chain. This allows farmers and stakeholders to adjust their practices, sourcing, and distribution methods in the face of challenges, thus maintaining continuity and minimizing losses.

Diversified Sourcing and Distribution Networks: Resilience in the supply chain often involves diversification of sourcing and distribution networks. By expanding their networks and exploring alternative channels, farmers and stakeholders can reduce dependence on single sources and markets. The expected outcome is a more robust and flexible supply chain that can withstand disruptions and adapt to changing conditions.

Improved Traceability and Transparency: Resilient farming systems often prioritize traceability and transparency throughout the supply chain. This can include the use of technologies like blockchain and IoT to track and record product movement, quality, and compliance. The expected outcome is greater transparency, accountability, and trust among stakeholders, leading to improved quality assurance and risk management.

Sustainable Resource Management: Resilient farming systems emphasize sustainable resource management practices. By adopting practices such as efficient water use, soil conservation, and integrated pest management, the expected outcome is the preservation and responsible use of natural resources. This outcome contributes to long-term environmental sustainability and resilience.

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Systemic Influences of Chief Risk Officer on Operational Resilience

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Disruptions within organizations and the supply chain in the last two decades have given thrust to the development of risk management practices within the supply chain to achieve operational resilience (Ho et al., 2015; Pournader et al., 2020). Establishing such practices within an organization involves the orchestration of organizational resources (El Baz & Ruel, 2021) and can benefit from the presence of executive function within the top management team (TMT) to govern the risk management-related tasks (Christopher & Peck, 2004). One of that can be the chief risk officer (CRO), which is increasingly prevalent and deemed strategic for corporate governance (Beasley et al., 2015). In that perspective, organizations with CROs might be able to better orchestrate their resources to enable risk management practices than other organizations without CROs, improving their resilience against operations and supply chain disruptions. However, current empirical research is limited in understanding the holistic impact of CRO appointments on operational resilience. The current literature has investigated other executive that is closer to the field, such as the chief supply chain officer (CSCO), in sustaining organization performance (Hendricks et al., 2015; Kroes et al., 2021; Roh et al., 2016; Wagner & Kemmerling, 2014). Only Li et al. (2022) investigated the CRO's effect on increasing organization performance in terms of operational efficiency and reducing firm risks. Therefore, this study is intended to complement previous studies in providing an understanding of the impact of CRO on operational resilience. Specifically, this study investigates the systemic impact of CRO presence on two capabilities. We leverage the concept of abnormal operating performance (Barber & Lyon, 1996) to measure loss minimization capability (LMC) and gain maximization capability (GMC) as indicators of operational resilience. Based on the Dynamic Managerial Capability (Adner & Helfat, 2003) and Behavioural Theory of The Firm (Cyert & March, 1963) perspectives, we hypothesize that (1) the presence of CRO enhances LMC of the organization and (2) the presence of CRO reduces the GMC of the organization.

Using a combination of Coarsened-Exact Matching and Propensity Score Matching in the data preparation and an Event Study Methodology in the hypothesis testing strategy, we analyzed quarter-level data from multiple databases of 235 organizations from non-financial industries that appointed CROs between 2000 and 2020. Our results show that CRO has a lagging and positive effect on loss minimization capability. That is, the presence of CRO helps organizations minimize the condition where operational performance is lower than the industry benchmark. However, we also found that the presence of CRO reduces the gain maximization capability of an organization. That is, the presence of a CRO limits an organization to continuously increase its operational performance when it is already higher than the industry benchmark. The abovementioned findings indicate that CROs help organizations to be partially resilient such that it improves the response and recovery capability but limit the growth capability. This effect is potentially due to stringent risk control that yields unwieldy bureaucracy in transforming positive risks into positive returns for operational performance. In practice, these findings improve our understanding of CRO's value by showing the systemic impact of CRO on operational resilience. Also, this study fills the gaps in research on antecedents of resilience in the OSCM perspective that rarely touches the top management team (Pettit et al., 2019).

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Supply chain responses to institutional turbulence: a resilience framework

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Introduction

The disruption of global supply chains and its ripple effects are increasingly recognized as a significant risk to the world economy both on an institutional and organizational level. As a response, governments, businesses and related institutions have called for and engaged in various activities to support, restructure and/or adapt the global flow of goods for more secure or resilient supply chains. The recent disruptions thus represent a turning point for the discussion about global supply chains and the associated globalization as the implications of the distorted supply chains greatly increase institutional turbulence among governments, businesses and society and subsequently lead to multiple new and emerging, often conflicting, demands in a supply chain context.

From an institutional view, these supply chains are confronted with so-called *institutional complexity*, i.e. multiple, and often conflicting so-called institutional logics. However, despite the acknowledgement of institutional influences as a critical factor, a structural recognition of how global supply chains and its members react on an institutional level is largely missing. While institutional scholars acknowledge that supply chains are often exposed to multiple and sometimes competing logics, existing literature makes no systematic predictions about the way how global supply chains react to such conflict on a broader institutional level and to build more resilient supply chains.

This is an attempt to provide a systematic and a more structured conceptualization how the interactions of institutional logics, influenced by field-levels structures and processes, impact global supply chains and how supply chains and their actors interact and influence both vulnerability and resilience.

Literature Review

Institutionalists would argue that pre-Covid-19 global supply chains represented a rather mature field, which was characterized by stable priorities between logics due to stable trades routes and predictable production outcomes. But the sheer scale of disrupted global supply chains challenged the priorities in the field, leading to institutional turbulence and thus to newly and sharp contestation between emerging logics as actors prioritize logics favorable to their normative beliefs or their material interests. In other words, the disruptions and the associated ripple effects along the supply chain unfold institutional complexity - resembling sites of an institutional "war", which in turn impact the flow of goods in supply chains to which institutions must respond.

Method

We adopt a systematic review to identify the specific institutional demands and institutional responses that shape supply chain vulnerability and supply chain resilience. More specifically, we employ a set of qualitative 'tactics' to generate meaning from the existing literature. By examining the various and patterned ways how logics converge, we are able to make inductions, derive meaning from the contextualized spaces where various actors with different interests negotiate at multiple levels between the concepts, and making deductions to interpret the relationships and implications for both supply chain susceptibility and supply chain resilience.

Findings

We identify three specific patterns of complexity and three institutional responses to supply chain vulnerability that influence supply chain resilience from a broader institutional and operational level to unpack the notion of institutional complexity that has rarely been discussed within the supply chain management discourse.

Contributions and Implications

Unpacking the various forms of institutional complexity stemming from institutional turbulence in and for supply chains advances theory in three ways: First, we identify three specific patterns of complexity that shape supply chain susceptibility, thereby showcasing how competing institutional logics contribute to the vulnerability of supply chains. Second, we classify three specific institutional responses to supply chain susceptibility, thereby providing a structured institutional theoretical foundation how supply chains respond to disruptions and increase supply chain resilience. Third, by expanding and extending research on institutional complexity to supply chains, we provide insights into how institutionalists view supply chain susceptibility, thereby providing managers with theory to think differently about supply chains and its resilience.

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The Role of Managerial Ties in Building Organizational Resilience during Pandemic Time - A Mediated Moderated Model

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Introduction

In recent decades, unpredictable business environment is continually posing threat to existence of business organization (Forliano et al., 2023; Jia et al., 2020). Particularly, the outbreak of COVID-19 in early 2020 has generated an unprecedented shockwave to global economy that abruptly interrupt firms' day-to-day operations (Xie et al., 2022). In consequence, it creates a chaotic and challenging environment for firms to operate and survive. To thrive in this 'new normal' business environment, firms need to invest in building its resilience capability that is highlighted in organizational resilience literature (Mithani, 2020). Organizational resilience not only enables firms to develop its preparedness capacity to tackle unexpected disruption but also to take necessary and quick actions to ensure business continuity (Hillmann & Guenther, 2021; Jia et al., 2020; Ozanne et al., 2022).

Resources and capabilities required to build organizational resilience has been studied extensively (Jia et al., 2020; Ozanne et al., 2022; Vakilzadeh & Haase, 2021). While various internal organizational resources and capabilities received greater importance in building organizational resilience, external resource and capabilities mainly emphasize on relationship building practices such as developing social capital with various business partners (Chowdhury et al., 2019; Jia et al., 2020; Ozanne et al., 2022), external tie strength (Ma & Zhang, 2022), collaboration (Waerder et al., 2021), and business network (Xie et al., 2022). These studies mainly highlight business partners e.g., supplier, customers, competitors as key sources to extract information and knowledge for building resilience excluding the role of other types of business partners such marketing, and technological collaborators. In addition to that there is significant gap in investigating the role of political partners e.g., tax bureaus, banks, and commercial administration bureaus except government (Ma & Zhang, 2022) who provided critical information and knowledge during pandemic time that contribute to firms' resilience building effort. These significant omissions in organizational resilience literature have been addressed in this study by theorizing the role of managerial ties that cover the role of all potential business and political partners.

Our study contributes to organizational resilience and managerial tie literature in several ways. First, this is first study that investigate the relationship between business and political ties in the context of pandemic as existing literature on managerial ties rarely investigate this relationship. Second, this study assesses the impact of business and political ties on organizational resilience. While exiting managerial ties literature mainly offer empirical evidence of the impact of both these ties on organizational agility (Zhang et al., 2022), various innovation oriented outcomes (Bashir et al., 2023; Chen et al., 2021; Ushie et al., 2023), supply chain integration (Chen et al., 2018), learning (Liu et al., 2023) and various performance outcomes (Yeniaras et al., 2021), resilience remains a significant omission in these studies. Third, we further explored the managerial ties and organizational resilience link by testing the mediating role of knowledge exchange combination. In existing literature knowledge exchange and combination is used as mediator other settings, such as managerial ties and innovation (Shu et al., 2012). Fourth, we investigate the moderating effect of firm size and firm age on the link between knowledge exchange and combination and organizational resilience.

Theoretical background

Grounding on social capital theory, this study first assesses the impact of business ties on political ties in the context of pandemic. We further investigate the role of managerial ties i.e., business, and political ties in developing organizational resilience. We explore these relationships by examining the mediating role of knowledge exchange and combination and examine the moderating role of firm age and firm

size on the link between knowledge exchange and combination and organizational resilience. Conceptual framework is presented in Figure 1

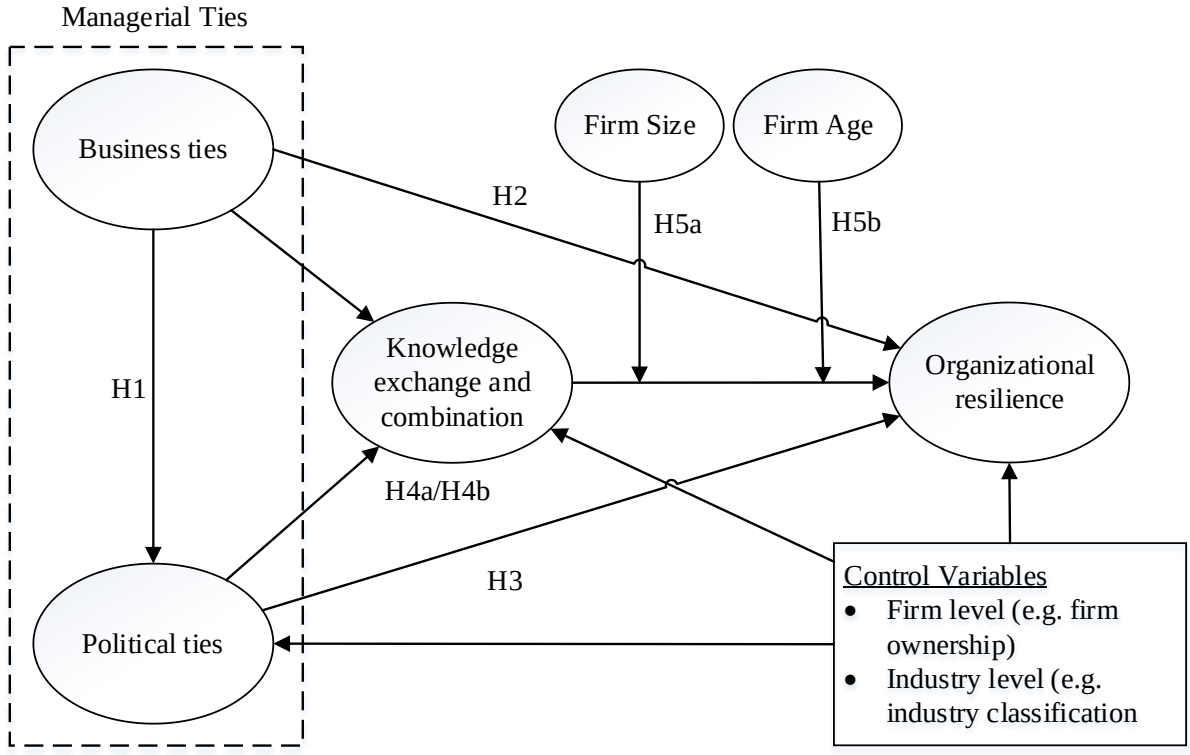

Figure 1: Conceptual framework

Methodology and Results

We collected data from 228 business organizations in Bangladesh. We analysed the data using partial least square based structural equation modelling (PLS-SEM) as majority data demonstrate non-normal data distribution. We followed the step-by step procedures suggested by Hair et al.(2022) to analyse our data.

Our findings reveal that ties with diverse business partners motivate managers to build ties with various political partners during pandemic time (i.e., support H1). This is a unique finding in the context of managerial ties and organizational resilience literature. While both business and political ties strengthen firms' resilience building activities (i.e., support H2 and H3), these relationships are partially mediated by knowledge exchange and combination (i.e., support H4a and H4b). Our results further suggest that firm age positively moderate the relationship between knowledge exchange and combination and organizational resilience (i.e., support H5b) but not firm size (i.e., do not support H5a). Our study extends the organizational resilience studies by demonstrating the importance of building ties with various business and political partners during pandemic time to reinforce its resilience building activities as they offer critical information and knowledge.

Discussion

Our findings have several theoretical implications. First, during disruptive environment, relational resources are those resources that remains intact (Ozanne et al., 2022). Our findings suggest that firms need to maintain ties with diverse business and political partners during pandemic time. Particularly various political partners such as ties with different level of government and local government officials played a critical role in shaping firm's pandemic response by offering various health and safety related information guidelines and financial support. In addition to that firm's ties with various business partners also helped firm to response and recover from this pandemic. These findings suggest that managers should invest time and resources in building strategic and long-term relationship with political partners (in addition to business partners) to secure access into critical information and knowledge. It further implies that this relationship building effort should not only emphasize during disruptive

situation but also during business-as-usual context. During business-as-usual context, this may be beneficial for firms to early access into information on various industrial policies and potential upcoming changes at industry level. Therefore, this is relatively a novel theoretical angle to enrich firms' relational resource that contribute to its resilience building effort. Second, our findings show that firms' existing relationship with various business partners motivate manager to build ties with political partners during disruptive situation. Finding implies that critical information and knowledge often resides in political partners that help firms in response and recover from a disruptive situation. As a result, managers are more inclined to build relationships with various political partners as part of their resilience building efforts. Third, our finding reveals the positive moderating role of firm age on the link between knowledge exchange and combination and organizational resilience. This suggests that longer the time firms are operating in a particular industry, it strengthens firms existing knowledge base on how to navigate disruptive situation and to build resilience.

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Role of Digital Transformation for Business Model Innovation in Transport logistics to enhance Resilience and promote Decarbonization

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Introduction and Literature

In this era of rapid change, digital transformation (DT) has emerged as a pivotal catalyst for reshaping business models (BMs) resulting in Business Model Innovation's (BMI) (Agarwal et al., 2021) , thus propelling towards a sustainable and resilient future (Kotarba, 2018; Vaska et al., 2021) . BMI when enabled through DT allows businesses to rethink, adapt and mobilise fundamental ways of organizing their resources and assets resulting in value creation, capture and appropriation (Huang & Ichikohji, 2023) . DT is indeed playing a pivotal role in enabling BMI in the transport and logistics (T&L) sector by offering new tools, data-driven insights, and innovative approaches to address emerging industry challenges. Underpinning emerging industry challenges, resilience in the T&L sector (Arora et al., 2020; Wan et al., 2018) is paramount, as disruptions caused by natural disasters, geopolitical tensions, or global health crises like COVID-19, and other transportation disruptions, e.g., the Suez Canal crisis, all of which have severely impacted domestics and global supply chains (Elgazzar et al., 2022; Zhang & Zhang, 2021). Decarbonization, another important imperative of the T&L sector owing to the substantial carbon footprint, waste management and circular economy, is critical for supply chain management (Ghisolfi et al., 2022).

Supply chains are increasingly on the lookout of resilience and sustainability, and in that context Trischler & Li-Ying (2022) defined BMI and presented key attributes of digitally enabled BMI through a targeted structured literature review of 57 publications concluding that DT was instrumental in shaping fundamental transformation of businesses. Further, Shi et al. (2023) presented an empirical study on the role of DT in attaining innovations in T&L supply chains, thus enabling supply chain resilience. With a focus on sustainability, McKinnon (2018) presented the green logistics framework and promoted its five strategies as the forward path to decarbonizing the T&L industry, wherein DTs role for enhancing business processes has been emphasized as an essential strategy. Additionally, scholars (Genzorova et al., 2019; Nekrasov & Sinitsyna, 2020) studied how proactive monitoring (life-cycle assessment) through DT adoption and management of business processes influences BMI through a case study in the T&L sector. In a similar vien, Li et al. (2022) reviewed the role of immersive technologies in T&L but lacked investigation on resilience and decarbonization.

Clearly, the above studies by various scholars, though value adding, lack an integrated view of simultaneous investigation of how the T&L industry sector can make use of emerging DTs, innovate their existing BMs, resulting in BMI with a special focus on resilience and decarbonization in the L&T end-to-end supply chain. Despite the developments of DT and its positive impacts on BMI, many research gaps remain in analyzing how the T&L sector can exploit DT to build resilient and carbon-neutral business models in the T&L sector. Thus, our study takes stock of this emerging multi-disciplinary research field through a detailed literature review and explores the critical role of DT in fostering BMI within the T&L industry, aimed at enhancing resilience and promoting decarbonization. In doing so, we set the stage for future research directions by conducting a thematic analysis that links DT, BMI, resilience and decarbonization in the T&L supply chains resulting in greater value creation, capture and appropriation (Agarwal et al., 2021).

Research Method

This study is multi-disciplinary and aims to provide an answers to the fundamental research question: *What and how the various DT applications can help innovate existing business models leading to better resilience and decarbonization in the T&L sector?*

This paper adopts PRISMA guidelines for the literature review process (Moher et al., 2009). We use a Google Scholar database covering online journals, unpublished studies, conference proceedings, industry trials, technical reports, and similar publications, with neither time nor geographical

constraints. Thus, criteria's such as journal rankings have not been used for exclusion purposes because this review aims to provide a comprehensive overview of the possible applications of DT for BMI in T&L for attaining better resilience and decarbonization. For the present review, 50 major studies from last five years were screened. Since Google Scholar makes all electronic resources available, other databases have not been used in this exploratory study, mainly to avoid repetition.

Contributions, Implications and Future Research Agenda

Based on the comprehensive literature review, this study answers three thematic research questions:

1. How DT can provide end-to-end supply chain visibility that can help identify vulnerabilities, enabling proactive decision-making and developing risk mitigation strategies for the T&L sector.
2. How adoption of DT enables T&L companies to rethink their end-to-end supply chain operations, strategies, and value propositions in order to prioritize sustainability efforts, thus transforming their BMs to effectively measure, manage, and reduce their carbon footprint.
3. What are the various antecedents, barriers, enablers, and outcomes of DT for BMI as part of a conceptual framework focussed on building resilience, sustainability and reducing carbon footprint in the T&L supply chain .

Based on the investigation, the study also identifies the following research agendas :

1. Develop a conceptual industry policy framework to examine the long-term impact of DT in T&L supply chains and to evaluate whether these initiatives lead to new BMs that help achieve the intended decarbonization outcomes, ingrain resilience as a component of sustainability, foster innovation over time (based on SDG: Goal 9) (Assarkhaniki et al., 2023) .
2. Investigate how companies in the T&L sector can effectively integrate carbon finance mechanisms to promote decarbonization into their existing business model strategies, thus incentivizing and financing sustainable practices via the BMI. This could include examining the challenges, opportunities, and best practices for incorporating carbon finance into T&L L&T supply chain operations.

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DECISION MODELLING AND STRATEGY DEVELOPMENT

Disruption-aware design for omnichannel fresh food supply chain

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Introduction and State of the Art

Fresh food produced globally is being wasted at an alarming rate of 1.3 billion tonnes per year, costing the global economy with $936 billion annually (FAO, 2021). The lost and wasted food represents a missed opportunity to feed the 26.4% of the world population today. According to FAO (2022) COVID-19 pandemic and the disruptions due to Russia-Ukraine war have exacerbated the situation, leaving over 768 million people at risk of food insecurity. The fresh food supply chain faces several complexities such as limited shelf life, susceptibility towards temperature and humidity fluctuations (Aung &and Chang, 2014), dynamic retail landscape based on consumption and buying trends and vulnerability to disruptions (Barman et al. 2021, Abbasian et al., 2023). To overcome this, cold chain logistics and freshness-keeping effort (Cai et al., 2010) and omnichannel distribution strategies (Chopra, 2018) have become essential for quality preservation, increasing the service level and flexibility across all touch points. However, the effect of freshness-keeping efforts on transportation cost and quality loss cost considerations are yet to be studied. Furthermore, as the number of channels increases, the logistic network becomes more and more complex, and designing cost-effective networks becomes imperative for increasing the adoption of omnichannel distribution strategies. Lastly, the high vulnerability of the fresh food distribution network towards changing environments and the general risks associated with quality degradation and food loss urge for a disruption aware food distribution network design.

This study aims at developing a mixed-integer non-linear programming (MINLP) model for a single objective cost-effective multi-echelon omnichannel fresh food distribution network under hub and route disruptions. The study seeks to provide insights for retailers and stakeholders to leverage freshness-keeping investments for a competitive advantage. Exact methods are used to solve the model on a small-scale instance to draw meaningful conclusions and managerial insights.

Model Formulation

The MINLP model derives from a multi-echelon resilient fresh-food distribution network under the route and hub disruptions. The given model encapsulates an omnichannel distribution strategy with a downstream fresh food flow from each echelon as illustrated in Fig 1. The presented disruption model newly integrates perishability concerns along with supply network costs by considering minimization of total cost of transportation, freshness-keeping effort, quality loss and disruption with freshness-keeping effort choice, food quantity shipments and route as the key decision variables.

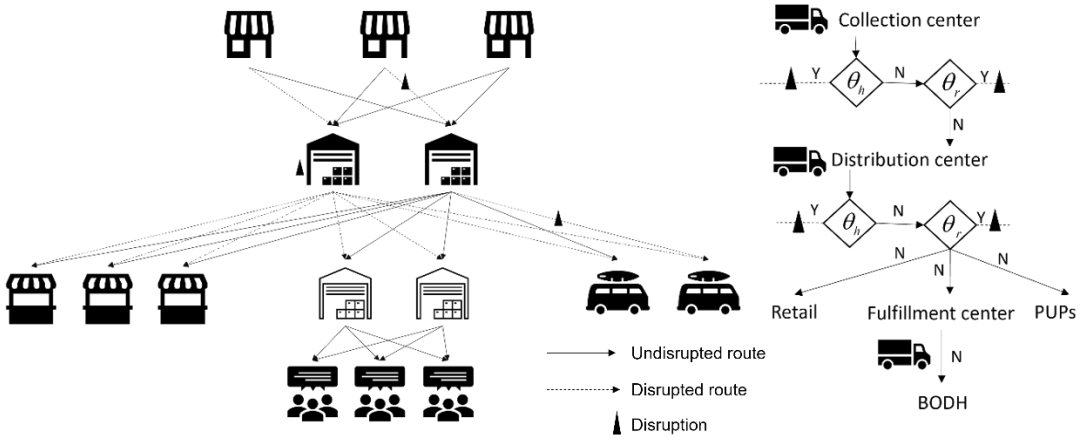

Fig.1. Schematic representation of disruption aware omnichannel fresh food supply chain

Data and Results

The MINLP model developed is solved with CPLEX using -Python 3.1 pyomo framework and Intel(R) Core (TM) i5-10400 CPU, having 2.90GHz processor paired with 16 GB RAM. Six cases considering small and large instances of the problem in combination with the presence and absence of hub and route disruption models. Additionally, the impact of increase in freshness-keeping effort levels and unit quality loss cost on nodes requiring investment on freshness-keeping activities, and the total supply network cost was investigated as shown in Fig 2 and 3.

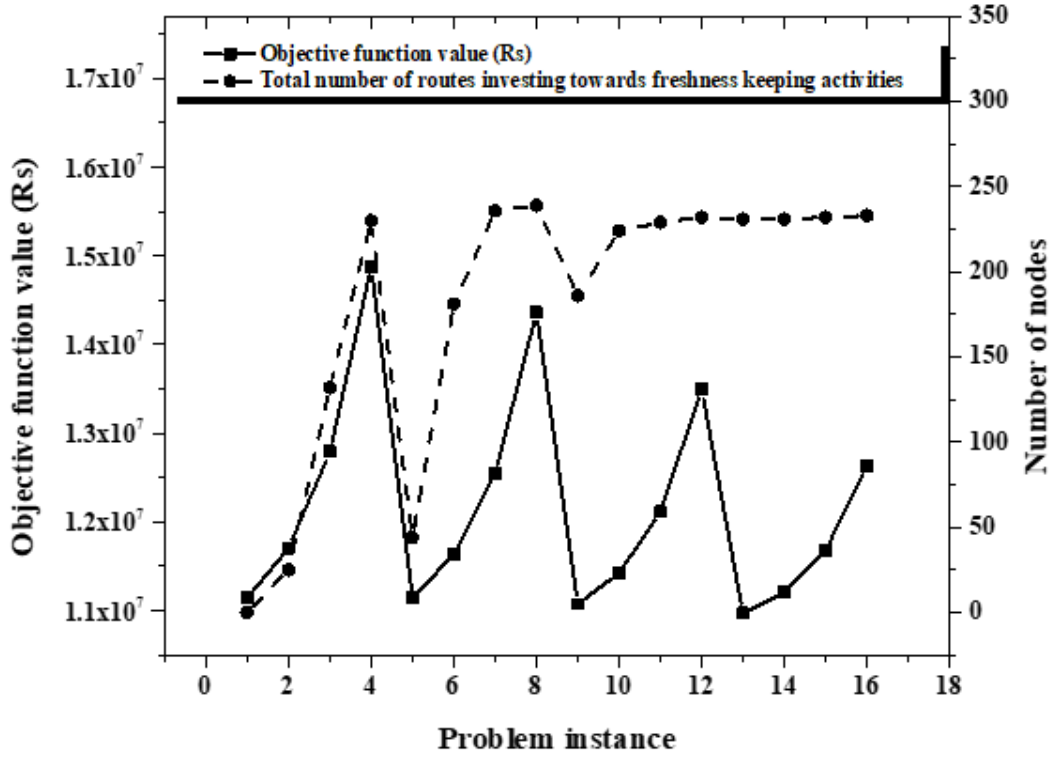

Fig 2. Freshness-keeping effort levels and unit quality loss cost effect on objective function value and number of nodes requiring investment on freshness-keeping activities

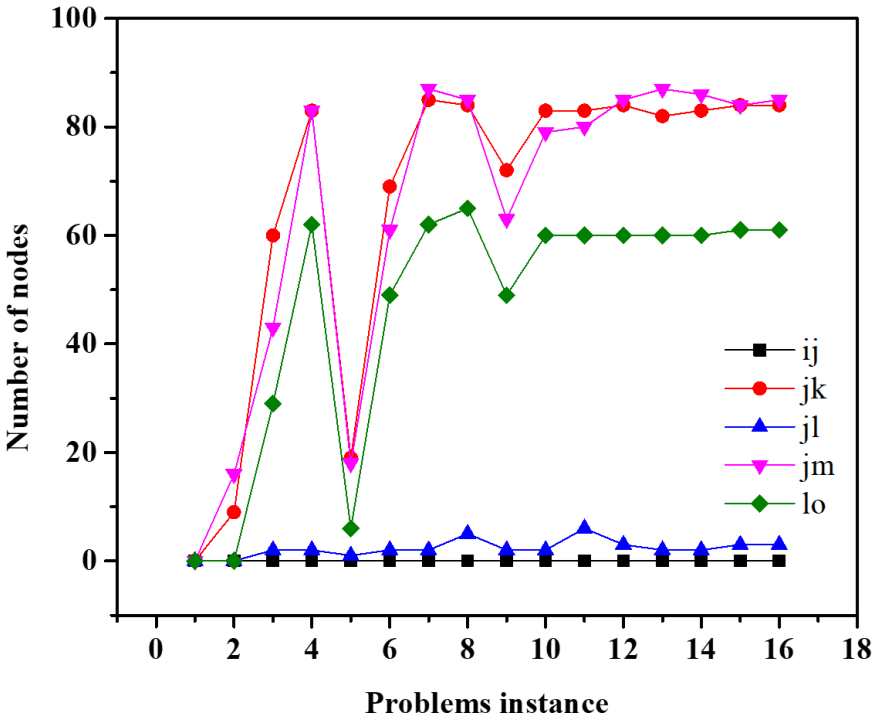

Fig 3. Freshness-keeping effort levels and unit penalty cost effect on number of nodes requiring investment on freshness-keeping activities at each echelon.

Discussion and Implications

The MINLP model helps to analyze the trade-offs between freshness-keeping investment cost, cost borne due to fresh food quality degradation with transportation and disruption costs in the network. The model assists in decisions regarding the transportation route selection under disruption, shipment quantity between each echelon and the choice to invest towards freshness-keeping activities. The study derives inferences and insights based on several problem instances solved in the presence and absence of hub and route disruptions. The proposed model validates applicability for sizeable complex distribution networks under disruption with increased overall costs. Further, sensitivity analysis exhibits that the decision to invest towards freshness-keeping efforts is optional in the first tier of the network between collection center and distribution center. This can be attributed to lower levels of loss in fresh food due to the high purchase probability at the first tier. While for the subsequent tier depending on freshness-keeping effort level ($\tau \geq 0.5$) investing in freshness-keeping activities becomes crucial. Therefore, presented models and inferences will be helpful to decision-makers in designing and strategizing the freshness keeping effort decisions with omnichannel distribution while reducing fresh food wastage.

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Financing and Farm-gate Pricing Strategies for Agricultural Cooperatives with Cash-constrained Farmers

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Introduction

As a member-owned organization, a co-op differs from other business structures and needs to follow user-owned, user-controlled, and user-benefiting principles. With these member-focused principles, a co-op does not lend itself to raising capital from non-member investors (Royerk and Karantininis 2007). Thus, a co-op's capital typically comes from its farmer-members, whose equity contribution is tied to the patronage provided by farmers (Burt 2004). This causes shortages in funds when co-ops increasingly require more capital investment for sustainable development, especially when farmer members are small-scale and cash-constrained. As a result, many co-ops are motivated to diverge from traditional financial structures and seek external, non-member investment while keeping the key principles of a co-op.

In this paper, we particularly consider three types of equity that are commonly observed in practice: (1) Common stock that farmers are required to purchase to join the co-op, which entitles them to membership and ownership rights; (2) Preferred stock that provides a fixed return to equity holders in the form of dividends; and (3) Outside stock that entitles the equity holder to share net profits with common stock. Both preferred and outside stock are accessible to external investors. However, As farmer-owned organizations, co-ops are subject to some restrictions when raising capital from external funds. This is because issuing external equity is a mild diversion from user-owned,user-controlled, and user-benefit principles. In response to this problem, many co-ops, in practice, take measures to control the size of external equity.

Literature Review

Our work contributes to the following aspect. First, we contribute to quantitative studies analyzing both financial and operational decisions of agricultural co-ops, while there is a general lack of such studies. The existing quantitative analysis on co-ops tends to focus on just one aspect of either financing or operations, and most of the relevant studies are qualitative or empirical (e.g., Borgen 2004, Russell et al. 2017, Rebelo et al. 2017, Golovina et al. 2020). Second, there is also a rich set of quantitative studies on co-ops' operational decisions. However, in these studies the financial aspect receives only minimal if any consideration. Third, there are only a few studies considering both financing and operations in agricultural co-ops.

Methodology

We propose a two-stage stochastic optimization model to study the financing and farm-gate pricing problem for a co-op that raises equity from both farmers and external investors. In the first stage, we model the decision process for the co-op initiator and the farmers as a Stackelberg game, in which the initiator takes the leader position and the farmers are followers. In the second stage, we consider competitive external investors, as is standard in finance and hence the co-op is the Stackelberg leader proposing financial contracts to investors.

Findings

First, we characterize the co-op's farm-gate pricing and financial strategies (i.e., whether to issue and how much to issue) in different scenarios. For both types of equity, farmers' wealth and the financial cost play a critical role in the co-op's decisions. Further, they both contribute to the formation of a co-op and improve the total profit. This provides support for external equity and is consistent with the practice that co-ops seek to issue external equity when possible in order to capture higher value.

Second, we find that the link between the farm-gate price and the financial strategies are different in each scenario. When issuing outside stock, the farm-gate price directly influences the co-op's financial strategies as well as the farmers' participation decisions; while when the equity is limited to common stock or issuing preferred stock, there is no such link.
Third, we show the sensitivity of the optimal financing strategies to various parameters. Further, we demonstrate that the pooling benefit of the co-op business is essential for farmers to participate, and also increases the co-op size and the farmers' total profit.
Finally, we provide implications for the co-op on which type of external fund to use. Basically, we show that preferred stock can (weakly) dominate outside stock due to its relatively low financial cost, more flexibility for setting the farm-gate price, and/or more tolerance on the fund size limit (non-dilution of ownership).

Contributions and Implications

We leverage our analysis to offer tangible insights that can help an agricultural co-op to make both operational and financial decisions.

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Managing Panic-Buying Challenges in Supply Chains during Large-Scale Disruptions: An Integrated Approach

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Introduction

The global supply chain landscape has faced unprecedented challenges due to large-scale disruptions like the COVID-19 pandemic, which have exposed vulnerabilities and underscored the need for resilient strategies. One such challenge that has emerged prominently is panic-buying, where consumers stockpile goods in response to fear-driven uncertainties, leading to sudden spikes in demand that overwhelm supply chains. Despite its critical impact on supply chain dynamics, there is a notable gap in the literature regarding viable models and strategies to effectively manage panic-buying related challenges during disruptions. This research aims to address this gap by developing an integrated agent-based modeling (ABM) and optimization approach to simulate supply chain behavior and assess strategies for mitigating panic-buying's adverse effects.

Literature Review

The disruptions caused by macro events such as pandemics, geopolitical conflicts, and natural disasters have led to supply chain vulnerabilities, revealing shortcomings in the resilience and agility of existing models (Gholami-Zanjani et al., 2021). Panic-buying has particularly magnified these vulnerabilities, resulting in shortages, price hikes, and operational disruptions. Unlike the gradual amplification of demand fluctuations seen in the bullwhip effect, panic-buying is marked by sudden and irrational surges driven by consumer fear (Rahman et al., 2022). While existing studies have addressed related concepts, such as consumer behavior during crises (Gupta et al., 2021) and adaptive strategies for supply chain resilience (Bender et al., 2022), a comprehensive model to tackle panic-buying's challenges remains underdeveloped.

Methodology

This study develops an integrated ABM and optimization method to address panic-buying challenges during disruptions in supply chains. The approach consists of three main components: (1) modeling the supply chain using agent-based modeling (ABM), (2) identifying viable strategies and recovery plans, and (3) evaluating their effectiveness through simulation and optimization methods. The ABM component involves creating a dynamic model that simulates the behavior of different actors within the supply chain, including manufacturers, suppliers, retailers, and consumers. This agent-based approach captures decision-making processes and interactions, enabling the exploration of various scenarios. The study proposes four key strategies to manage panic-buying challenges: (1) increasing production, (2) optimizing inventory and ordering strategies, (3) collaborating with local suppliers, and (4) leveraging third-party transporters. The simulation and optimization component assesses the impact of the proposed strategies and recovery plans under different scenarios. By applying optimization methods, the study identifies optimal parameter values that enhance supply chain resilience, agility, and survivability. Through a combination of simulation and optimization, the framework provides insights into the effectiveness of strategies in mitigating panic-buying-related disruptions.

Findings

The simulation results indicate that the proposed strategies have significant potential to mitigate panic-buying challenges and enhance supply chain performance during disruptions. Increasing production to meet demand surges and collaborating with local suppliers for efficient raw material availability were found to be effective in reducing shortages and maintaining product availability. Optimizing inventory

and order strategies, along with leveraging third-party transporters, contributed to smoother product distribution and reduced total supply chain costs. The study's findings demonstrate that timely implementation of these strategies is crucial to minimizing the overall impact of panic-buying on the supply chain.

Contributions

This research makes several notable contributions to the field of supply chain management. Firstly, it addresses a critical gap in the literature by developing a comprehensive model to manage panic-buying related challenges during large-scale disruptions. The integration of ABM and optimization methods provides a novel approach to simulate and evaluate supply chain behavior, offering insights into effective strategies. Secondly, the study contributes to the understanding of panic-buying's unique characteristics compared to other supply chain dynamics, such as the bullwhip effect. This distinction enables decision-makers to tailor strategies specifically to address panic-buying challenges, considering its sudden and fear-driven nature.

Implications

The findings of this research have significant managerial implications for supply chain practitioners and decision-makers. The proposed strategies offer actionable insights to enhance supply chain agility, resilience, and survivability during disruptions caused by panic-buying. By implementing these strategies, businesses can better prepare for and respond to sudden demand surges, ensuring the availability of essential products and minimizing disruptions. Moreover, the integrated ABM and optimization approach provides a practical tool for decision-makers to assess the impact of various strategies before real-world implementation, reducing risks and costs associated with strategy adoption.

Conclusions and Future Research Directions

In conclusion, this research introduces an integrated approach to address panic-buying challenges in supply chains during large-scale disruptions. By combining agent-based modeling and optimization methods, the study develops viable strategies and recovery plans to enhance supply chain resilience, agility, and survivability. The findings offer actionable insights for practitioners to effectively manage panic-buying-related disruptions and minimize their adverse effects on supply chain dynamics. As future research, empirical validation of the proposed strategies across diverse industries and contexts can further refine their applicability and effectiveness.

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Research on the evolution game of drug quality and safety supervision based on consumer feedback mechanism and government punishment mechanism

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Drug quality and safety is a major livelihood issue and a key point in implementing the development strategy of healthy China. This paper explores how to ensure and improve drug quality and safety under the background of "two-invoice system" policy in pharmaceutical supply chain. Firstly, this paper constructs an evolutionary game model of drug quality and safety regulation composed of the government, a drug manufacturer, a drug distributor and a medical institution, and introduces Cobb-Douglas production function to measure the payment matrix of each game player. Secondly, two uncertain factors, namely the consumer complaint rate and the probability of government finding unqualified drugs, are incorporated into the model to analyze the stability of each game player's strategy choice. Finally, this paper uses system dynamics simulation to analyze the effects of enterprises' own drug quality and safety factor input efficiency, consumer feedback mechanism and government punishment mechanism on system evolution.
The results show that: (1) The higher comprehensive technical level and the higher elastic coefficient of labor or capital input are conducive to the game participants to invest in drug quality and safety. In the drug production supply chain dominated by different major factor inputs, the participants with higher major factor inputs have a higher probability of investing in drug quality and safety. (2) Consumers' awareness of rights protection is strengthened, and the higher complaint rate is conducive to the game participants to improve their awareness of drug quality and actively invest in drug quality and safety. (3) The government strengthens the review of drugs and takes strong penalties against illegal enterprises, which is conducive to improving the quality awareness of pharmaceutical enterprises and the initiative of investment in drug quality and safety, thus reducing the risk of drug quality and safety. According to the research results, we put forward corresponding policy suggestions, which can provide theoretical basis for the government to improve the design of drug quality and safety collaborative supervision mechanisms.
Keywords drug quality and safety; “two-invoice system” policy; Cobb-Douglas production function; evolutionary game; system dynamics simulation

Looking Ahead by Looking Back – Gilmour's Contributions to Australian Operations Management

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The management of operations has evolved over many centuries. However, the field was articulated, perhaps for the first time, in a text titled *De re Metallica* written in Latin by a German scholar Georgius Agricola (1556). It was inscribed in the context of mining operations and described various processes in the operations of mines including digging, roasting, crushing washing ore, and separating minerals. Later Smith (1776; 1937) laid the foundation of production/operations management and productivity (economics). In 1908 production/operations management entered into higher education when a course on '*Industrial Organisation'* was introduced at the Harvard Business School (Sprague, 2007). Since then the field has evolved remarkably with the change in business environment, market requirements, and technological innovation. Although the globalization phenomenon may have reduced the procedural differences in the management of operations in different economies, there still exists operational uniqueness within a particular geographical region. In light of this background, this study investigates the works of Gilmour in operations management (Gilmour, 1979; 1987;1991; 1993; 1995), in the context of Australian businesses and proposes issues and expectations for a way forward for academics in Australia.

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SUPPLY CHAIN MANAGEMENT

Exploring the key factors affecting the supply chain resilience in the construction industry in Australia

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Introduction

The Australia Construction Industry was impacted by the COVID-19 pandemic significantly. It was reported that sales revenue was $453.0 billion which decreased 1.5% in the last five years. The profit also declined 9.4% between 2018 and 2023 (Kelly 2023). The residential building construction sector only maintained marginal revenue growth at 0.2% through the year of 2022 and 2023 to reach $70 billion (Kelly, 2023a). The industry was affected by the disruption of the supply chain due to the delayed supply of construction equipment and materials from overseas, increased building material costs and shortage of skilled labour (Kelly, 2023). The objectives of this research are to identify the key issues leading to the supply chain disruption and explore what are the key factors affecting the supply chain resilience of the construction industry. It also proposes measures for companies to take effective measures to improve the construction supply chain performance during the post COVID-19 period to realise forecast that the sector is expected to grow 1.1% annually from 2023 to 2028.

Literature review

Supply chain resilience (SCR) is defined as firm's ability to absorb disruptions or enable the supply chain network to return to state conditions faster and thus has a positive impact on the firm performance (Christopher and Peck, 2004; Peck, 2005). The supply chain disruptions are caused by some external factors such as natural disasters, political unrest or conflicts, terrorisms or internal factors such as sudden increased of demand from customer orders or decreased supply of raw materials (Gunasekaran et al., 2015). Pettit et al. (2013) identify some vulnerability factors to SCR which include turbulence of environment, deliberate threats, external pressure, and resource limitation etc. Singh et al. (2019) indicates that the disruption in the supply chain is due to short product life cycle, high variability of demand, outsourcing, lack of visibility related to IT commitment.

After reviewing the SCR literature, the conceptual model of the key factors affecting the SCR in the construction industry in Australia are developed. The conceptual framework includes five key factors: *agility, efficiency, visibility, collaboration, and innovation.* and two dependent variables: *supply chain resilience (SCR)* and *supply chain performance* (*quality*, *cost*, and *time*).

Method

The study adopts a mixed research method. Both quantitative data and qualitative data were collected to understand how the Covid-19 impacted on the supply chains of the construction industry in Australia and how the construction firms coped with the disruptive supply chain issues during and after the pandemic period. The quantitative data were collected by conducting a survey to participants who work in the construction companies in Australia. The multiple hierarchical regression analysis was used to analyse the data collected. Interviews were conducted to gain deeper understanding of key factors affecting the supply chain resilience issues of construction companies.

Findings

The findings of the study reveal that the construction sector in Australia is confronted with many issues such as high labour costs, skill shortage, health and safety issues due to the Covid-19, project delays and quality issues. All the issues lead to the high vulnerability of supply chains. The analysis results reveal that SCR has a significant positive effect on the supply chain performance. The Australian construction supply chain was disrupted by some external factor COVID-19 pandemic and decreased supply of raw materials and many projects were delayed (Kelly 2023). The situation became worse in

the residential construction sector after the pandemic. Many well-known builders such as Porter Davis, Probuild and PBS went bankrupt. The Australian Securities Investment Commission (ASIC) reported that 1753 companies went bankrupt in 2023 compared with a total of 1284 companies last year (Norman, 2023). The research findings support Pettite et al. (2013) and Singh et al. (2019) who argue that building up a resilient supply chain is essential to improve the supply chain performance in terms of quality, cost, and time.

The analysis results fully support that *collaboration* has a significant relationship with supply chain performance: *quality*, *cost*, and *time*. Managing effective relationships between supply chain partners, customers and design agents can help firms reduce the risks of supply chain disruptions. The information can be shared between supplier chain partners and design agents which benefits both parties to seek solutions when some uncertainties such as suddenly increased demand, potential quality issues or supply shortages occur (Hsieh, 2018; Gunasekran et al., 2015). The analysis results also found that *visibility* has a significant effect on the *supply chain performance*: *time* which indicates that the information sharing, and quality of information sharing can help construction firms to better react to suddenly increased delivery time or increased demand due to bullwhip effects or other external uncertainties such as natural disasters or pandemics.

The analysis results also reveal that *innovation* has a significant negative effect on the time of completing construction projects which imply that some construction did not manage the innovation well. Although the innovative technologies such as Building Information Modeling (BIM), simulation, 3D modelling, artificial Intelligence or Blockchains started to be adopted in the construction industry in Australia, however, there are a great number of companies are small and medium sized companies and they lack the resources and capabilities to adopt innovative technologies.

Contributions and Implications

In conclusion, construction companies in Australia need to have a deeper understanding of various reasons for the vulnerability of the supply chains in the construction industry. It is vital for these firms to devise strategies to build up a resilient supply chain to minimise the risks involved. A conceptual model developed by this research can shed light how firms gain better understanding of key factors affecting the supply chain resilience and develop measures to improve the construction supply chain performance.

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Environmental Impact Analysis of Point of Sales Receipts Supply Chain

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Transactions within payment systems provide the foundation for a functioning economy and society by facilitating payments for exchanges of goods and services. Point of sales (PoS) receipts transmit information to facilitate payment transactions and exchanges, provide a record of their occurrence and a proof of purchase. This service fulfils many needs at the point of purchase and beyond. PoS receipts have predominantly been transmitted through paper-based materials, most recently using thermal paper (Eckardt & Simat, 2017). However, the social and environmental impact of thermal paper supply chain is high (Green America, 2019). As a result, digital transaction and electronic or smart receipt services have grown in popularity and have started to layer over or replace the service once exclusively offered by paper receipts (Green America, 2019). Despite having a huge importance of studying the social and environmental impact of paper receipts as against digital receipt, surprisingly research on this issue is rare. Therefore, the aim of this study is to determine the environmental impact of printed receipt supply chain as against digital receipt supply chain. In line with the research objective this study, using both primary and secondary data, adopted environmental input-output (EIO) approach to quantify the impact. The study has significant contribution to sustainability literature. Our study finding also has significant implications for the policy makers and the decision makers of retail and bank service providers.
Key words: Environmental impact, supply chain, digital receipt, paper receipt, Point of sales

Unpacking the Role of Cognitive Biases in Supply Chain Management Decision-Making: An Interdisciplinary Approach

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Introduction

Supply chain disruptions, represent a crucial challenge business. While many attribute operational setbacks to external events like natural disasters or geopolitical shifts, it is becoming clear that cognitive biases may play a significant role. Responses to such disruptions by companies like Ericsson and Nokia highlight the influence of cognitive biases on decision-making (Peltonen & Peltonen, 2019). Yet, the role of such biases in supply chain decision making remains largely unexplored. Grounded in behavioral decision theory, this research seeks to look at how how cognitive biases, such as confirmation bias, status quo bias and escalation of commitment bias, shape supply chain decisions. Through this inquiry, the study aims to provide insights for enhancing risk management strategies, advocating for a comprehensive approach that integrates both conventional factors and the psychological dimensions of decision-making.

Literature review

The study of supply chain management has witnessed a paradigm shift in recent years, with a growing emphasis on the behavioral aspects of decision-making. Traditionally, supply chain decisions were predominantly based on quantitative models and deterministic factors. However, in the past decade the human element, characterized by a range of cognitive biases, has emerged as a significant determinant in supply chain and operations management (Smith & Tan, 2010; Johnson, 2012).

One of the most pronounced themes in Behavioral Supply Chain Management is the importance of integration. Frohlich and Westbrook (2001) highlighted that achieving global success necessitates effective integration, emphasizing seamless coordination and communication across the entire supply chain. This perspective is further supported by Oliva and Watson (2011), who argued that integration is not just about processes but also about aligning organizational goals and objectives.

The evolution of buyer-supplier relationships is another significant theme. Historically adversarial, these relationships have undergone a transformation, becoming more collaborative in nature. Terpend et al. (2008) emphasized the importance of fostering trust and shared value in these relationships. Kaufmann and Carter (2006) further elaborated on this, suggesting that collaboration with external partners is now a strategic necessity rather than a mere operational requirement.

Cross-functional alignment has also been identified as paramount for achieving optimal performance. Oliva and Watson (2011) have been instrumental in highlighting the necessity for coordination between various units within organizations. This perspective resonates with the findings of Chopra and Meindl (2018) and Mentzer et al. (2001), who provided insights into the intricacies of supply chain networks and the importance of relationship management.

Behavioral Supply Chain Management	
Theme	**Authors**
Psychological Aspects of Supply Chain Decision-Making	Rungtusanatham et al. (2011), Wu & Katok (2006), Carter & Stevens (2007), Ebrahim-Khanjari et al. (2012), Croson et al. (2014), Kull et al. (2014), Narayanan & Moritz (2015), Tokar et al. (2016), Hyndman & Menezes (2021), Bachrach & Bendoly (2011), Siemsen (2011), Oliva (2022), Moritz (2022).
Information Sharing in Supply Chains and Emerging topics	Croson & Donohue (2003), Ren et al. (2010), Chen et al. (2013), Inderfurth et al. (2013), Ren, Cohen, Ho, & Terwiesch (2010), Spiliotopoulou et al. (2016), Johnsen (2020); Barrett & Whybark (2003), Craighead et al. (2007), Choi et al. (2008), Wiedmer (2020), Papier (2021), Ma (2021).

However, as the primacy of human decision making and the potential for cognitive biases become dominant themes in understanding supply chain management, we need to transition to Behavioral Operations Management. Aksin, Armony, and Mehrotra (2007) highlighted the behavioral nuances in call centers, emphasizing the importance of understanding human factors in operations. Boyer and Hult (2005) championed a customer-centric strategy, suggesting that understanding customer behavior is crucial for operational success. Linderman, Schroeder, and Choo (2006) further emphasized the importance of clear objectives in operations, while Das, Pagell, Behm, and Veltri (2008) highlighted the symbiotic relationship between safety and quality.

An interdisciplinary approach in operations management has been gaining traction. Bendoly, Donohue, and Schultz (2006) highlighted the significance of incentivized decision-making experiments with human participants in this domain. Pilkington and Meredith (2009) identified a trend towards integrating social network analysis, thereby blending operations with other disciplines like psychology and economics. This interdisciplinary blend has been further advocated by Bendoly, Croson, Goncalves, and Schultz (2010).

To summarize, the existing body of literature highlights the increasing importance of factors in supply chain and operations management. Combination of these insights of different disciplines enable us to build more realistic models with various dimensions and complexities ranging from individual cognitive biases to organizational dynamics (Kahneman & Tversky 1979). As the field progresses it is crucial to prioritize these behavioral elements. Additionally digital transformation and sustainability are two interconnected areas for research and implementation (Lee & Whang 2004; Green et al., 2012). Digital transformation focuses on optimizing supply chain processes through technology while sustainability emphasizes viability and social responsibility. These aspects are not subcomponents but interconnected aspects that contribute to an effective supply chain design. To address the complexities and fluctuations of challenges, in supply chain and operations management (Sterman, 1989) it becomes essential to synthesize interdisciplinary perspectives encompassing psychology, environment and technology.

Method

Using grounded theory which's a qualitative research approach that involves deriving theories directly from empirical data, we conducted interviews with supply chain managers. The aim was to develop a theoretical framework that focuses on understanding the behavioral risks involved in supply chain decision making. This framework served as a foundation for formulating hypotheses to be tested empirically. We then conducted an experiment involving a sample of 400 supply chain managers from the United States, United Kingdom, New Zealand, Australia and Canada. The purpose of this step process was twofold; firstly, to validate and refine the initial theoretical framework based on the interviews; and secondly to explore cultural differences in managerial decision-making practices within the domain of supply chain management. To provide clarity on this intricate methodology we have included a comprehensive breakdown of the research process, in subsequent sections.:

Objective: To construct an initial theoretical framework based on the experiences and insights of supply chain managers.

1. Grounded Theory Approach:

Procedure:

Sampling: Purposeful sampling was employed to select experienced supply chain managers who have faced significant decision-making challenges.

Data Collection: Semi-structured interviews were conducted, focusing on their experiences, challenges, and the role of cognitive biases in their decision-making processes.

Data Analysis: Transcripts were analyzed using open, axial, and selective coding to identify patterns, themes, and relationships.

Framework Development: Insights from the analysis were used to construct an initial theoretical framework highlighting the influence of cognitive biases on supply chain decisions.

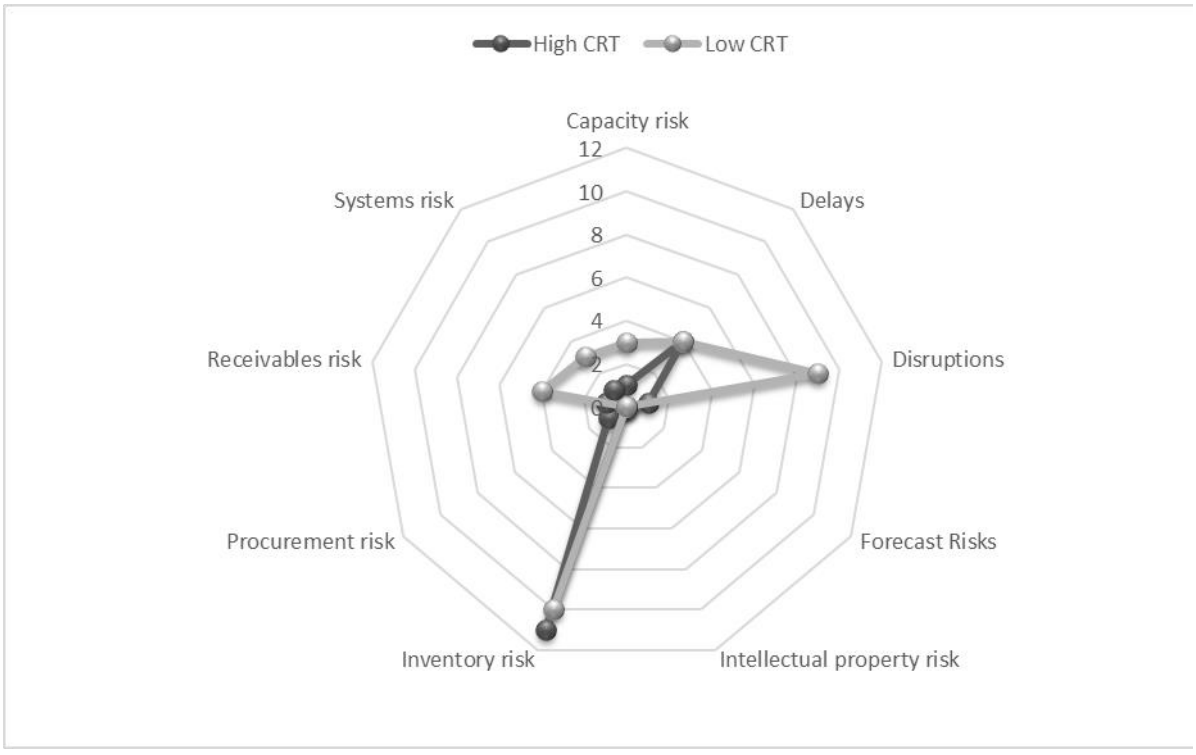
2. Experimental Study:

Objective: To validate the theoretical framework and understand the behavioral risks managers encounter during supply chain design decisions across different cultural contexts.

Procedure:
Sampling: A total of 400 supply chain managers from the US, UK, NZ, Australia, and Canada were selected using stratified random sampling to ensure representation from each region.
Experiment Design: A series of hypothetical supply chain scenarios were presented to participants. These scenarios were designed to elicit responses that could indicate the presence of cognitive biases like Status quo bias, confirmation bias, escalation of commitment bias, and availability bias.
Data Collection: Participants' decisions and justifications in each scenario were recorded.
Data Analysis: Responses were analyzed quantitatively to identify patterns of biases and qualitatively to understand the underlying thought processes.
Cultural Analysis: Results were further analyzed to identify any cultural variations in decision-making biases.

Findings
The theoretical framework seems to overlook the importance of the six factors that drive supply chain performance—facilities, inventory, transportation, information, sourcing and pricing—as discussed by Chopra et al. (2016). These factors play a role in achieving a balance between responsiveness and efficiency in a supply chain ultimately impacting both the operational and financial performance of businesses. Based on our findings we have noticed a possible hint of availability bias (Figure 3) as it appears that managers focus on risks that the hear and see more about in risk categorization. This bias has implications for managing these factors and consequently influencing the outcomes of supply chain design. In the experimental phase we aim to explore the presence of status quo bias and examine how risk perceptions and attitudes among supply chain managers may affect the strategic alignment of these six key drivers.

Figure 3 Risk drivers identified by participants grouped by their CRT score



Contributions and Implications
The main objective of this research is to explore how biases, specifically the Status quo bias, confirmation bias and availability escalation bias, influence decision making in supply chain management. Of studying the inherent characteristics of supply chain integration buyer supplier relationships or cross functional alignment this study aims to understand how these biases can impact

these important aspects of supply chain management. Initial findings suggest that these biases can significantly influence choices related to supply chain design. Therefore, it is crucial for practitioners to actively promote integration, foster collaborative external relationships and ensure cross functional alignment while being aware of these biases. This study takes an approach by integrating perspectives from psychology, economics and operations management to gain a nuanced understanding of how cognitive biases operate in different cultural contexts. Using a grounded theory methodology combined with an experimental study the research provides valuable insights into the behavioral aspects of supply chain management. In summary this study contributes to the academic discourse on behavioral supply chain management by examining the interaction between cognitive biases and key operational considerations.

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Blockchain Data Integration from Off-Chain Systems: Exploring Interoperability and Governance

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Introduction and Literature Review

Blockchain technology, first popularised through Bitcoin (Nakamoto, 2008), offers significant potential benefits across various economic sectors that promise cost savings, enhanced efficiencies, and novel opportunities. Blockchain operates as a distributed ledger technology (DLT), allowing transparent, and immutable peer-to-peer transactions (Pimentel and Boulianne, 2020). Given its attributes, such as decentralization, anonymity, and traceability, the technology has garnered significant interest from business and academic communities (Moll and Yigitbasioglu, 2019, Helliar et al., 2020). Blockchain is still an embryonic technology within organizations, reshaping businesses with expected substantial global economic impact. Therefore, it requires a theory that discusses how blockchains evolve within organizations, demanding more research to improve its application in real-world settings.

Prior research has focused on conceptual explorations and systematic reviews on the introduction of blockchain in different businesses (Bellucci et al., 2022, Centobelli et al., 2021, Yin, 2018) and integrating the technology with existing external systems (Bonsón and Bednárová, 2019, Kuruppu et al., 2022). The integration of off-chain data with blockchain platforms is a vital concern as blockchain evolves within industries to manage increasing demand, efficiency, auditability, and reducing fraudulent activities (Garanina et al., 2022, Kuruppu et al., 2022). However, few studies have been conducted to examine the practical implications of the data integration process of blockchain, benefits, and interoperability, which is identified as a significant research gap (Bonsón and Bednárová, 2019, Lardo et al., 2022, Tyma et al., 2022). The integration process ultimately concerns the interoperability of blockchains with existing business systems such as Enterprise Resource Planning platforms (ERP) and Know Your Customers (KYC). If integration and interoperability can be enhanced, blockchains can expand their applications beyond mere proofs-of-concept to deliver tangible business benefits.

Furthermore, the effectiveness of governance in integrated systems is pivotal (Waye et al., 2023) to manage substantial risks for participants and system integrity, which relies on efficient controls involving multiple stakeholders, decisions and responsibilities. Therefore, this study explores blockchain implementation benefits and barriers, including off-chain data integration, emphasising the interoperability of deployed blockchain systems and the control structures (governance) that underpin them.

Theoretical Framework

This study will be framed by the Diffusion of Innovation (DOI) theory as it offers a critical and multifaceted lens to understand the sophisticated dynamics of blockchain diffusion (Rogers, 2003). The theory provides a robust framework for dissecting the complex processes of blockchain adoption and integration by portraying the stages of diffusion, knowledge, persuasion, decision, implementation, and confirmation. Alternatively, Abrahamson and Rosenkopf (1997) extended the DOI theory by exploring how external factors can moderate the diffusion process by discussing fads or fashions. These two theories complement each other in discussing the blockchain as a novel technology and how it diffuses or dismisses. Helliar et al. (2020), Nam et al. (2019) explain that relatively latter two stages of DOI remain less investigated. However, these stages have been instrumental in interpreting the evaluation and final acceptance or rejection of this innovative technology and portray an essential role in ensuring the sustainability of blockchain integration (Waye et al., 2023, Hartley et al., 2022), which discover reinvention, re-modulation, and necessary modifications as required. Further, it emphasises blockchain's capacity to encapsulate technological, social, and psychological dimensions, thereby enabling a comprehensive analysis of diffusion (Helliar et al., 2020). Hence, the latter stages of blockchain diffusion, which remain underexplored, are the primary focus of this research, enhancing

both academic insight and practical strategies in the ever-evolving diffusion in the technological landscape.

Methodology and Data Analysis

The research aims to explore blockchain diffusion, identifying significant drivers and barriers of off-chain and blockchain data integration, interoperability, and control governance system underpinning it. To explore this, the study adopts a qualitative approach with convenience and purposive sampling methods, which allow the discovery of blockchain implementation in practicality, considering a diverse and varied sample. The research expands across two business sectors: banking/finance and logistics, which are considered forerunners in implementing blockchain and are forecasted to invest significantly in blockchain technology. The research primarily focuses on a semi-structured interview approach to explore insights from interviewees in selected Australian based companies. We will use a predesigned set of questions covering all main research concepts, allowing interviewees to address various aspects and expand as desired while covering the key facets of the primary research areas.

Conclusion

A crucial aspect of unlocking blockchain's full potential lies in overcoming the challenges of integrating off-chain systems and ensuring seamless interoperability to enhance efficiency, productivity, and privacy to address the increasing economic demands. Despite its significance, limited research exists on blockchain integration's practical implications, benefits, and barriers. Therefore, this research will evaluate the potential implications and issues with how conceptual explorations of blockchain technology translate into organisational realities. It will bolster the DOI theory, offering more profound insights into implementing, confirming, and utilizing blockchain technology.

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