CONSUMER MOTIVATION TO COLLABORATE IN LAST MILE LOGISTICS

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Statement of originality

This is to certify that the content of this thesis is my own work. This thesis has not been submitted for any other degree or purpose.

I certify that the intellectual content of this thesis is the product of my own work, and that all assistance received in preparing this thesis and all sources have been acknowledged.

Gareth Jude

Abstract

The rapid growth of online shopping has created significant challenges for retailers, particularly in last-mile logistics. The transfer of goods from retailer to consumer requires the management of picking, packing, delivering, and processing returns, but often results in delivery delays, missed orders, and high costs for consumers. One way to address these challenges is through consumer collaboration, where shoppers assist in the process by using services such as click-and-collect, parcel lockers, or location-aware delivery apps. This study examines what motivates consumers to collaborate with retailers in last-mile logistics.

This research aims to assess the extent to which established Supply Chain Collaboration (SCC) theories and frameworks, originally developed in business-to-business contexts, can explain consumer motivation to become active collaborators in last-mile logistics. Drawing on both SCC and consumer co-creation (marketing) literatures, a framework was developed around three antecedents of consumer motivation: perceived value, brand relationships, and consumer self-efficacy, leading to three hypotheses.

Survey data was collected from 374 online shoppers who actively engage in last-mile logistics collaboration. The collected data was analysed using partial least squares structural equation modelling (PLS-SEM). Results showed that perceived value and self-efficacy were significant antecedents of consumer motivation, while – somewhat unexpectedly – brand relationships were not. Based on these results, a revised two-stage model was proposed, indicating that consumers first recognise the value of collaboration before becoming regular collaborators, with varying influences at each stage.

This study contributes to theory by extending SCC research into the consumer domain. It highlights that consumer motivation follows a two-stage process, unlike the single-stage models typical in business-to-business contexts, and shows that although similar factors apply across both domains, their impact differs by stage. In practice, the study advises retailers to broaden value propositions, simplify collaborative processes, and target younger and more educated consumers, who are most likely to collaborate frequently. These insights underline the need for business strategies that recognise the distinct nature of consumer collaboration.

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Publications

Journal articles

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Artificial Intelligence Statement

During the preparation of the thesis the author used ChatGPT for text enhancement. The use of this generative AI tool included paraphrasing, sentence structure, and spelling. The author confirms that where text was modified by generative AI, the content was reviewed for possible errors, inaccuracies, and bias. The author takes full responsibility for the submitted thesis and ensuring the work is their own and has used generative AI within the parameters of use recommended by the University of Sydney in Research – Generative-AI: guidelines for researchers.

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Abbreviations

ABDC	Australian Business Deans Council
ABS	Australian Bureau of Statistics
AI	Artificial intelligence
B2B	Business to Business
B2C	Business to Consumer
CB-SEM	Covariance-based structural equation modelling
DART	Dialogue, Access, Risk and Transparency model
fsQCA	Fuzzy sets qualitative comparative analysis
GPS	Global positioning system
GSMA	Global System for Mobile Communications Association
ML	Machine learning
PLS-SEM	Partial least squares structural equation modelling
SC	Supply chain
SCC	Supply chain collaboration
SCM	Supply chain management
SEM	Structural equation modelling
SKU	Stock keeping unit
SLR	Systematic literature review

Chapter 1 : Introduction

1.1 Introduction

This study focuses on consumer collaboration in last mile logistics, with particular attention to the motivations that drive consumers to engage with retailers through services such as click and collect, parcel lockers, and location aware delivery applications (apps). Understanding these motivations is increasingly important as retailers seek to manage the rising costs and complexities associated with home delivery of online orders. Despite the growing relevance of this issue, the supply chain collaboration (SCC) literature has yet to adequately address the consumer's role as an active participant in supply chain (SC) processes, revealing a significant gap in current knowledge.

This chapter begins by providing background to the research. It explains the origins of SCC using the famous collaboration between Walmart and Procter & Gamble (P&G) to illustrate the facilitating role of technology and the benefits that attract actors to collaborate in the SC. The scope of the literature that has investigated SCC across multiple industries and SC stages is outlined. It then explains the role of last mile logistics in retail SCs as well as the particular challenges presented by home delivery of online orders. Examples are given of the ways consumers can collaborate in last mile logistics and how their collaboration can benefit both consumers and retailers.

Section 1.3 articulates the motivation for this research. The academic motivation (Section 1.3.1) stems from the need to address a gap in the SCC literature. The consumer cocreation literature, mainly from the marketing discipline, contains many investigations of consumer collaboration at various SC stages including a small number in the last mile logistics context. However, no study has yet addressed consumer collaboration from an SCC perspective. Section 1.3.2 outlines the practitioner motivation which is to better understand what motivates consumers to collaborate, thereby enabling retailers to develop strategies to encourage more to do so and reduce the operational challenges associated with home delivery. Finally, this section discusses the author's personal motivation shaped by a career in the retail industry during a period of significant transformation facilitated by digital technologies.

Section 1.4 presents the aims and objectives of the study. The overarching aim is to explain the extent to which existing knowledge and frameworks in the SCC literature, supplemented by

insights from the consumer cocreation literature, can be used to explain the emerging motivation of consumers to collaborate with retailers in last mile logistics. Several objectives are outlined that support this aim.

Finally, Section 1.5 describes the significance and contributions made by this study including its theoretical contributions to the academic literature on SCC and its practical implications for retailers seeking to foster more effective consumer collaboration.

1.2 Research background

This study examines the emerging phenomenon of consumer collaboration in the SC. The research is positioned in the SCC literature, which, although well-established in the business to business (B2B) domain, has yet to consider the consumer as an active collaborator. The subject of the study is last mile logistics where consumers are increasingly collaborating with retailers in the delivery of online orders.

1.2.1 Supply chain collaboration (SCC)

SCC is a well-established research area within the literature of supply chain management (SCM), the concepts of which have been practised by businesses since the mid-1980s. SCC is founded on the idea that more value can be created in a SC by businesses pooling their resources and skills than by competing in transactional relationships. Walmart and Procter & Gamble (P&G) were early proponents of SCC. In their initial collaboration, Walmart supplied scanned sales data from the baby diaper category to P&G who in turn used their ability to influence production schedules to ensure stock supply at the right level (Grean & Shaw, 2002). SCC practices are now widespread in many industries and have been shown to deliver many benefits such as improved productivity, responsiveness, lower SC costs, improved market share and competitiveness, higher return on assets, improved product quality, and better customer service (Chengalur-Smith et al., 2012; Narasimhan & Nair, 2005).

SCC relies on technology for the collection and exchange of information between actors. It is no accident that the first practical examples of SCC developed shortly after the adoption of the barcode and electronic methods of exchanging data in the retail SC. The barcode allows retailers to scan sales at the checkout, linking each transaction with a specific stock keeping unit (SKU). Prior to the barcode, retailers could determine the total cash collected in each transaction but relied on manual methods, such as sales ledgers and periodic stocktakes, to determine the sales rate of

individual SKUs. Electronic methods of transmitting data allow retailers to transmit scanned sale information in virtual real time. Previously, retailers had used telecommunications devices such as facsimile machines, telex, and phone calls to report daily SKU-level sales. These were re-entered in support offices, meaning managers only had actionable sales data days after the event.

Walmart was one of the first retailers to use scanned sales and electronic methods of transmitting data. Scanned sales and a private satellite network to facilitate real time data transmission were implemented in the early 1980s (Fishman, 2006; Laudon et al., 2018). According to Grean and Shaw (2002) it was P&G who first recognised the potential of Walmart's scanned sales data as the foundation for a new model of business collaboration. P&G proposed that Walmart should share its scanned sales data directly with the supplier. This access would enable P&G to use its understanding of production schedules and distribution capabilities to allocate inventory more accurately across stores. To support this collaboration, a joint team was formed with members from both companies. The pilot project demonstrated significant improvements in stock availability, inventory turnover, and reduced replenishment lead times.

Technology enables SCC but does not guarantee its success. Several high-profile failures in the early days of SCC illustrate the importance of organisational, relational, and strategic alignment in collaborative SC initiatives. For example, the failed partnership between British retailer Marks & Spencer and its suppliers in the early 2000s was attributed not to technology shortcomings, but to poor communication, misaligned incentives, and a lack of trust between partners (Christopher & Peck, 2004). Similarly, grocery retailer Sainsbury's launched a program aiming to improve collaboration with key manufacturers and suppliers in 2000 but despite significant investments in technology, the project was abandoned by 2005. The failure stemmed from organisational misalignment, poorly defined collaboration roles, and an underestimation of the need for cultural and process change among partners (Simchi-Levi et al., 2008).

The first academic articles recognising SCC as a separate part of the SCM literature appeared in the 1990s. Soosay and Hyland (2015), in their comprehensive review, highlighted the work of Ellram and Cooper (1990) as one of the foundational contributions to the field. Their article distinguished between traditional transactional SC relationships and more strategic, collaborative forms of engagement. Since then, a substantial body of literature has emerged exploring various dimensions of SCC, including trust and commitment (Nyaga et al., 2010), information sharing (Li & Lin, 2006), and joint decision-making (Simatupang & Sridharan, 2005). More contemporary articles have investigated themes such as SC resilience, particularly in response to disruptions like

COVID-19 (Ivanov & Dolgui, 2021), how digital technologies (e.g., blockchain, and artificial intelligence) enable more effective inter-firm coordination (Agrawal et al., 2023) and sustainability-focused partnerships (Zhu et al., 2017).

The scope of the SCC literature extends beyond the retail SC to fields such as manufacturing, healthcare, and agriculture (e.g., Bag et al., 2023; Chatha et al., 2023; Lobo et al., 2013). It also been examined vertically (between actors at different SC levels) as in retailer– supplier studies (e.g., Chae et al., 2005; Lindsey Hall et al., 2022) and horizontally (between actors at the same SC level) as for example in studies of SCC between logistics providers (Ismail et al., 2022).

Numerous scholars have attempted to define and categorise the levels of SCC, typically progressing from arm's-length cooperation to coordinated processes, and ultimately to full SC integration (e.g., Mentzer et al., 2001). These typologies often include indicators such as the frequency and quality of information exchange, alignment of objectives, and shared risk and reward structures. However, despite these efforts, definitional ambiguities persist. As Cao and Zhang (2011) noted, SCC remains a "multidimensional and dynamic construct", and its interpretation often varies based on industry context, organisational capability, and strategic intent.

1.2.2 Consumer collaboration

The mass adoption of smartphones and the ecosystem of apps and facilitating technology surrounding them means that consumers now have the platform to communicate with other actors in the SC just as businesses did when SCC emerged in the late 1980s. Furthermore, smartphone adoption is now ubiquitous. Smartphone adoption reached 86% globally in 2024, with projections indicating an increase to 93% by 2030. (GSMA, 2025)

The connectedness of consumers has allowed them to become active collaborators in the SC at various stages. At the product design stage, consumers have become collaborators in the creation of products and services. For example, Lego's "Idea Platform" (Lego, 2024) allows consumers to propose designs for new products. If the consumer design achieves 10,000 supporters from the Lego community, it moves into the Lego design pipeline and consumer co-designers receive a 5% royalty on all sales of resulting products. In manufacturing, consumers have become collaborators in the finishing and customisation of products. For example, Nike allows members to customise their footwear purchases, either in store or online, creating unique pieces for their enjoyment (Nike, 2024). In finance, consumers have become collaborators through various types of subscription models. For example, in Amazon's "Subscribe & Save" program (Amazon, 2024),

consumers provide finance via an upfront subscription payment and in return receive regular repeat deliveries of products with discounts off the normal price. In logistics, consumer collaboration is increasingly prevalent in the receipt of online deliveries through services such as click and collect, parcel lockers, and location aware delivery apps. For example, Domino's "Pizza Tracker" app allows customers to track the progress of their delivery but also allows Domino's to locate the customer's device thus allowing deliveries to non-addressed locations like parks and minimising the chances of a failed delivery.

Businesses benefit from consumer collaboration in a similar way to when they engage in SCC with other businesses. Nishikawa et al. (2013) have shown that customer designed products in Japanese retailer Muji stay on range longer and sell better than those created by in-house designers. Norton et al. (2012) coined the phrase "Ikea effect" to describe the extra value consumers attribute to products they help produce and their willingness to pay more for them. Wagner et al. (2021) showed that consumer commitment to subscriptions in the grocery sector generates dual benefits: improved cash flow for grocers and an increase in both the frequency and volume of consumer purchases.

1.2.3 Last mile logistics

Retail SCs have historically ended at the retail store, but the rise of e-commerce has extended these chains to encompass the picking, packing and delivery of online orders, as well as reverse logistics for handling returns. This extension is often referred to as the "last mile" of logistics. Major retailers and logistics providers have been required to invest in dedicated last mile infrastructure such as localised fulfillment centres, route optimisation tools, and more flexible delivery scheduling all of which have added operationally complexity.

The rise of online platform retailers like Amazon and Alibaba has redefined expectations around delivery speed, with same-day and next-day shipping becoming the new norm (Mims, 2018). The ever-increasing speed of delivery has been driven in part by online platforms' desire to minimise the instant fulfillment advantage of traditional brick and mortar retailers. Traditional retailers have responded with hybrid fulfillment models such as click and collect and ship from store, in which online orders are shipped not from a central distribution point but from the nearest brick and mortar store (He et al., 2021). Technology has played a pivotal role in this transformation. Artificial intelligence and machine learning are now used to predict delivery windows, optimise routing, and personalise delivery experiences (Ferreira & Esperança, 2025). Simultaneously, there has been growing interest in sustainable logistics, prompting experimentation with electric delivery vehicles,

bicycle couriers and consolidated urban deliveries (Lauenstein & Schank, 2022). Alternative delivery locations, like parcel lockers and pick up points, have also emerged to improve convenience and reduce costs (Collins, 2015).

1.2.4 Consumer collaboration in last mile logistics

Last mile logistics are complex and expensive for retailers (Cárdenas et al., 2017) and are also a potential source of dissatisfaction for consumers. For retailers, home delivery comes with a significant penalty to profitability and poses a strategic threat that third party delivery partners may take ownership of the customer relationship or even evolve into direct competitors (Eley, 2020; Incisiv, 2021). While home delivery offers convenience for consumers, it does have drawbacks. A recent international survey of 3,000 consumers found that consumers have problems with high shipping costs (62%), damaged packages (51%) and lost packages (41%), and almost 78% are highly unlikely or not very likely to buy again from a retailer following a negative delivery experience (Shipengine, 2024).

Effective consumer collaboration in last mile logistics can help reduce delivery and logistics cost and complexity for retailers by reducing the number of processes involved and increase the likelihood of a satisfactory delivery experience for consumers by reducing the opportunities for process failure. Consumer collaboration in last mile logistics refers to the delivery initiatives where consumers share or take on responsibilities typically managed by retailers. Examples include services such as click and collect, parcel lockers, and location aware delivery apps, all of which require active consumer participation.

When consumers collaborate via click and collect, they relieve retailers of the packing, delivery and reverse logistics responsibility associated with home delivery. Retailers also gain the opportunity to upsell to customers who come to the store to pick up. Research by Capital One (2025) suggests 85% of click and collect customers spend extra money in store when they come to pick up an online order. Consumers collaborate by using their own resources to deliver the goods to their home and returning them to the retailer if need be. In doing so, they get to choose the time when they receive the goods and avoid most of the causes of dissatisfaction associated with home delivery such as delivery fees, inflexible delivery windows, excessive packaging, failed delivery and damage and loss in transit (Nguyen et al., 2018; Shipengine, 2024). Consumers require a digital resource such as a smartphone to facilitate receipt of pick up information and verification codes. Many American retailers such as Home Depot and Best Buy actively encourage click and collect by providing preferential parking spots or drive through facilities.

When consumers collaborate via parcel locker pick up, retailers bear most of the responsibilities associated with home delivery but they avoid having to deliver to homes. This is a considerable benefit as it reduces failed deliveries, and delivery routes can be optimised to a small number of locker locations reducing overall costs (Boysen et al., 2021). Retailers often choose to charge a delivery fee if the locker is external to the store. Consumers collaborate by delivering the goods to their home and returning them to the retailer if necessary (when picked up from a locker external to the store). In return, consumers get to choose the time when they receive the goods and avoid the risks associated with inflexible delivery windows, excessive packaging (if picked up in a retail store), failed delivery, and damage and loss in transit. Like click and collect, parcel locker pick up requires consumers to deploy a digital resource such as a smartphone to facilitate pick up. Online retailer Amazon has a parcel locker network in many countries including 23,000 in Europe alone (*Parcel Lockers in Europe: Key Players*, 2024). These lockers only accept deliveries of goods purchased through the Amazon website thus restricting the benefits to Amazon and their customers.

When consumers collaborate with retailers via location aware delivery apps, retailers bear almost all of the responsibilities associated with home delivery but there are some key benefits. The most important of these is that by using location data from the customer's device they can minimise failed deliveries (even to non-addressed locations like parks) and increase delivery speed. A key motivator for the development of Domino's Pizza tracker app was the ability to regulate driver speed and thus improve safety (*GPS Driver Tracker: Born out of safety*, n.d.). Consumers expend few resources when receiving an order via a location aware delivery app but do need a digital device with GPS capability and an app to track their shipment. In return, consumers receive delivery time certainty and minimise the risk of failed delivery and damage and loss in transit.

Consumers can also participate in last mile logistics through crowdsourcing. Crowdsourcing allows consumers to perform deliveries for retailers on a casual basis using their own vehicles under programs such as Walmart's "Spark" (Rajagopal, 2023). However, programs like Spark offer paid employment rather than collaboration on the basis of pooled resources to enhance value so are out of scope of this study.

Use of collaborative last mile logistics services is widespread and growing. Exact numbers are difficult to identify but according to E-Marketer (Feger, 2024), in 2024 the US had 150.9 million click and collect users and 38.3 million parcel locker users. Worldwide, more than 3 billion consumers used location aware delivery apps in 2024 in the online food delivery sector alone (Beyrouthy, 2024).

1.3 Research motivation

1.3.1 Academic

Given the significant benefits that businesses can derive from collaborating with consumers, it is necessary to understand the antecedents that motivate consumers to engage in SCC. The SCC literature has introduced many theoretical frameworks to explain the antecedents of SCC. However, this literature is overwhelmingly concerned with B2B collaboration, not business to consumer (B2C) collaboration. In the rare situations when consumers are included in a study, they are treated as passive receivers of value created by businesses and used to investigate issues such as supply and demand coordination (e.g., Chi et al., 2020), channel optimisation (e.g., Li & Yu, 2017), pricing policy (e.g., Chen et al., 2013) or as sources of demand information (e.g., Ma et al., 2024). To the best of our knowledge, there are no studies in this literature with a prime focus on the motivation of the consumer as a value creating collaborator in the SC, particularly in last mile logistics. This gap has been noted in recent years, resulting in multiple calls for research on this topic (Lusch, 2011; Rouquet et al., 2017; Soosay & Hyland, 2015; Tokman & Beitelspacher, 2011).

Some attempts are being made to address this gap from the marketing perspective through consumer cocreation studies. The pioneering study of Vargo and Lusch (2004) proposed a service dominant logic for marketing in which goods are characterised as appliances for service delivery and value is "co-produced" in use. In subsequent years, Grönroos and Gummerus (2014) and others have evolved the concept of cocreation toward a process of interaction between actors where their processes merge into "one collaborative, dialogical process". Many studies in the cocreation literature have examined consumer motivation to become active collaborators in the creation of value with businesses. For example, Füller and Bilgram (2017) have examined the influences on consumers' motivation to collaborate with businesses in new product development. Im and Qu (2017) have examined the influences on restaurant customers' motivation to cocreate a menu item with chefs and servers. A small number of these studies are beginning to investigate consumer cocreation in last mile logistics. For example, Vyt, Jara et al. (2022) have examined the effect of convenience in consumer motivation to engage with a retailer in the cocreation of click and collect services. However, as yet no attempt has been made to address the motivation of consumers to collaborate from a SCC perspective.

In summary, the motivation of consumers to collaborate in the SC is under researched in the SCC literature. The marketing cocreation literature contains many studies exploring the motivations of

customers to collaborate with businesses including a small number that are beginning to investigate last mile logistics but so far, no study has examined this from an SCC perspective.

1.3.2 Practitioner

For retail practitioners the continuing growth of online sales represents a difficult conundrum. On one hand, the additional revenue generated online is welcome, but on the other hand the logistical, administrative and financial challenges associated with home delivery can outweigh the benefits. Studies show that online orders are less profitable than in-store purchases and retailers fear that engaging third party logistics operators to fulfil those orders threatens competitive advantage by diluting retailer–customer relationships (Hübner et al., 2016; Incisiv, 2021). In the early days of online selling, when online sales represented only single digit percentages of total sales, the additional cost and complexity could be explained as a marketing expense associated with customer retention. However, in 2024, online sales have reached 21.2% of total retail sales in the US, 17.9% in Europe and 25.6% in Asia-Pacific (eMarketer, 2024). At these levels, e-commerce is no longer a marginal activity but a core retail channel. By shifting part of the delivery responsibility to the customer, through models like click and collect, parcel lockers or location aware delivery apps, retailers can mitigate the cost and complexity of home delivery.

Retailers are also under constant pressure to optimise customer experience. The retailing sector, by its nature, is highly competitive. Barriers to entry are low, consumers can easily move their spending between retailers and retail categories, and in some sectors a small number of powerful supplier brands control distribution (Porter, 1980). In this environment retailers strive to optimise customer experience in every interaction to retain customers. Unfortunately, home delivery of online orders suffers from persistent customer experience issues such as failed deliveries, damage of goods in transit, theft of goods from doorsteps and driveways and inconvenient delivery windows. When these issues arise, research shows that consumers attribute responsibility to the retailer (Shipengine, 2024). Consumer collaboration in delivery can help mitigate some of these issues by putting the customer in control of the time and location of collection and releasing the retailer from this responsibility.

In summary, collaborating with consumers in last mile logistics is a way to mitigate the cost and complexity of home delivery and provide customers with a better delivery experience. The financial and competitive benefits are compelling. By providing retailers with a deeper understanding of the motivations of consumers who already collaborate in last mile deliveries this research will help retailers to develop strategies to encourage more to do so.

1.3.3 Personal

My personal motivation stems from a career in the retail industry as a practitioner and supplier. Over the years I have directly observed many of the benefits described in the literature that accrue from SCC, including increased efficiency, better alignment of incentives, and enhanced service delivery (Simatupang & Sridharan, 2005; Soosay & Hyland, 2015). I have also observed how SCC can be encouraged and what happens when it is abandoned. Simultaneously, I have experienced the evolution of online sales from a niche adjunct of mail order to being a significant but increasingly problematic proportion of total sales that requires a new operational approach.

Among retail professionals, there is a tacit understanding of what is required to initiate and conduct a successful supplier collaboration. This industry knowledge provides a logical and accessible foundation to explore how more consumers can be motivated to do the same. If this research reveals a large overlap between what motivates businesses and consumers to collaborate in the SC then existing business strategies can be extended to encourage more consumers to collaborate. Conversely, if significant differences are found, the contrast with established B2B practice will help frame the necessary strategic adaptations in terms practitioners will be familiar with.

This research is also driven by a career long interest in the transformative potential of technology in the retail industry. Over the past few decades, retailers' ability to capture, exchange and analyse data has improved dramatically, transforming retail efficiency and customer service (Byrnjolfsson et al., 2013). For example, barcode technology helped reduce safety stock and the space required in retail storerooms. One estimate suggests barcode adoption reduced inventory levels by up to 30% across SCs (Laudon et al., 2018). The introduction of the internet and other electronic means of sharing data has created numerous benefits beyond the ability to trade online. For example, digital scheduling tools have replaced paper-based rosters, ensuring accurate shift coverage and improved time management.

More recently, the analytical power provided by machine learning (ML) and artificial intelligence (AI) has transformed many aspects of retail including stock forecasting. Enhanced demand forecasting through advanced analytics ensures optimal stock placement, reducing waste and increasing responsiveness to consumer trends (Cao, 2021). The widespread adoption of smartphones has further accelerated this transformation. Mobile devices now enable communication and data exchange between retailers, suppliers, team members and consumers. Importantly, this connectivity has facilitated emerging models of consumer collaboration in SCs

where smartphones serve as platforms for collection coordination, delivery tracking, and consumer feedback (e.g., Bettiga et al., 2017; Lego, 2024; Nike, 2024).

1.4 Research aims and objectives

This study aims to explore the extent to which the existing knowledge and frameworks in the SCC literature, supplemented by insights from the consumer cocreation literature, can be deployed to explain the emerging motivation of consumers to collaborate with retailers in last mile logistics. To do so, an initial generic framework (Model 1), grounded in the existing literature, is developed to identify key antecedents of consumer motivation to collaborate in the SC. Model 1 is then tested using survey data from 374 Australian online shoppers. Based on the findings, an extended framework (Model 2) is proposed which provides further insights into the antecedents driving the motivations of consumer collaboration.

The objectives of this study are to:

1. Identify relevant SCC and consumer cocreation literature that deals with the antecedents of consumer motivation to collaborate in the SC.
2. Construct a generic framework that graphically represents the relationships between the identified antecedents.
3. Test the framework using empirical data.
4. Assess how effectively the framework explains consumer motivation to collaborate with retailers in last mile logistics and modify the framework accordingly.
5. Identify future research opportunities in this area.

Esper et al. (2020) have noted the divergence of the marketing discipline and the logistics and SC discipline over the last 50 years and advocated for their re-integration in response to the rise of the consumer as an active SC actor. This study addresses that gap by developing and testing a framework that explains the antecedents of consumer motivation to collaborate in last mile logistics, drawing insights from both SC and marketing literatures.

1.5 Research significance and contributions

This study is significant because it addresses an important contemporary issue in the retail SC. The continued growth in online shopping has brought increasing logistic cost and complexity for retailers. Engaging consumers as active collaborators in the delivery process through click and

collect, parcel lockers and location aware delivery apps can mitigate some of these challenges for retailers and improve delivery experience for consumers. Understanding the motivation of consumers to engage in collaboration is therefore vital to improving the efficiency and effectiveness of last mile logistics operations. SCC is well established in the retail industry, but the literature has so far only considered the B2B domain and has not addressed the consumer as a value generating collaborator.

This study makes several important contributions to both academic literature and retail practice explained in the following sections.

1.5.1 Contributions to the literature

The first contribution of this study is to advance the SCC literature into the consumer domain addressing longstanding calls for investigation in this area (Lusch, 2011; Rouquet et al., 2017; Soosay & Hyland, 2015; Tokman & Beitelspacher, 2011). An emerging body of literature, primarily from the marketing discipline, has recently explored what motivates this collaboration from a cocreation poerspective (e.g., Vyt et al., 2022; X. Wang et al., 2023). However, none has yet examined consumer motivation to collaborate from an SCC perspective. This study bridges that gap and contributes to the emerging field of consumer logistics (Esper et al., 2020).

This second contribution to the literature is to provide an extensive review which identifies key antecedents, theories, methodologies and contexts in SCC and consumer collaboration. To the best of our knowledge, no prior review has specifically focused on the antecedents that motivate SCC, particularly those that that drive consumers to actively engage in SCC.

The thrid contribution to the literature is to introduce the conception of consumer motivation to collaborate as a two-stage process. In the first stage consumers perceive value in collaboration, and in the second stage they decide whether to become regular collaborators. This distinguishes consumer collaboration from the single-stage process that can be obeserved in the B2B collaboration literature. Additionally, we introduce the differential effect of the antecedents of motivation at each stage.

1.5.2 Practical and managerial implications

This study contributes to practice by advancing our understanding of the antecedents of consumer motivation to collaborate in the retail SC thereby challenging long established and understood

methods of managing collaboration. We show that consumer collaboration is a two-stage process whose antecedents must be managed differently at each stage which differs from the single-stage process established in the B2B domain. A number of practical suggestions are made to adapt management practices to the B2C domain of collaboration in the SC.

As a pioneering study this research offers many opportunities for further enquiry. The thesis provides a hypothesis for testing and suggests specific areas where this research may be extended.

1.6 Thesis outline

This study assesses to what degree a framework of antecedents of motivation to collaborate developed from the SCC literature, with additional insights from the consumer cocreation literature, can be used to explain the emerging phenomenon of consumer collaboration in the SC. We use last mile logistics as the context for our research. The thesis is structured as follows.

Chapter 1

This chapter provides a structured introduction to the research including, a comprehensive background of the SCC domain where consumers are emerging as active collaborators, an articulation of the motivations for the research from academic, practitioner and personal perspectives, the aims and objectives of the study, the significance of the study to the literature and practice and an outline of the thesis structure and chapters.

Chapter 2

This chapter examines the existing literature on the antecedents of motivation to collaborate in the SC. The review draws on both the SCC literature and additional articles from the consumer cocreation literature. Section 2.1 introduces the chapter. Section 2.2 describes in detail the process adopted for the systematic literature review following the six-step paradigm suggested by Durach et al. (2017). Section 2.3 presents a provides a detailed thematic analysis of the reviewed articles which are graphically depicted in a framework of antecedents of consumer motivation to collaborate in the SC. Section 2.4 introduces and justifies the research hypotheses.

Chapter 3

This chapter justifies the selection of the research method and analytical approach adopted for this study to investigate the research problem and the proposed hypotheses. Section 3.1 introduces the

chapter. Section 3.2 reviews the methods used in related literature and analyses their suitability for this research. The selection of survey method is justified. Section 3.3 reviews the analytic methods used in related studies that use survey methodology to evaluate their suitability for this study. This section justifies partial least squares structural equation modelling (PLS-SEM) as the adopted method.

Chapter 4

This chapter provides a detailed discussion of the design and testing of the survey instrument, the rationale adopted for sampling and the administration of responses. Section 4.1 introduces the chapter. Section 4.2 explains the tailored approach taken to designing the survey instrument following the recommendations of Dillman et al. (2014). Section 4.2.1 explains the reasons for adopting a cross sectional and explanatory design. Section 4.2.2 explains the selection of the questions for the instrument and their relationship to the proposed structural model. Section 4.2.3 discusses the pretesting of the survey and modifications to the survey instrument. Section 4.3 explains the process used to determine the sample size, how respondents were selected and recruited, the rationale for selecting the online delivery mode, outcomes from the pilot phase and how the final dataset for analysis was derived.

Chapter 5

This chapter provides an overview of the dataset for analysis, and the results obtained from the testing of the structural model (Model 1). Section 5.1 introduces the chapter. Section 5.2 provides an overview of the data including the demographic profile of the sample and the type and frequency of their collaboration in last mile logistics.. Section 5.3 contains the analysis of the structural equation model including the evaluation of the measurement model and evaluation of the structural model. The process of analysis follows the recommendations of Sarstedt et al. (2019), Cheah et al. (2019) and Hair et al. (2021). Section 5.4 interprets the results in relation to the research hypotheses.

Chapter 6

This chapter proposes a revised and extended structural model (Model 2) based on questions arising from the testing of Model 1 as well as insights from the literature and practice. Section 6.1 introduces the chapter. Section 6.2 explains the rationale behind the design of Model 2. Section 6.3 analyses the estimation of Model 2 using the data previously collected to test Model 1 and

compares the results. Section 6.4 interprets the significance of the results in relation to the latent variables deployed in Model 2. The chapter concludes that Model 2 provides a superior explanation of the motivation of consumers to collaborate in last mile logistics when compared to Model 1. However, additional testing with original data would be required to validate these findings.

Chapter 7

Chapter 7 summarises and interprets the findings of the research. Section 7.1 summarises the findings on the antecedent influences on consumer motivation to collaborate that were identified in Chapter 2. Section 7.2 outlines the research's contribution both to the literature (Section 7.2.1) and to practitioners (Section 7.2.2). Finally, in Section 7.3 the limitations of the study are acknowledged and an extensive range of future research opportunities in this emerging field are discussed.

Chapter 2 : Literature Review and Research Hypotheses

2.1 Introduction

Chapter 1 introduced the background and context of this study, situating it within the domain of SCC, where consumers are increasingly seen as active collaborators. Particular attention was given to the complex and costly challenge of last mile logistics, which has become a growing area of interest for retailers amid the continued rise of e-commerce. The chapter also outlined the academic, professional, and personal motivations driving this research which are to address gaps in current literature, offer actionable insights for retailers, and explore questions inspired by the author's industry experience.

The overarching aim of this study is to explore the extent to which existing knowledge and frameworks from SCC literature, augmented by insights from consumer cocreation literature, can explain emerging consumer motivations to collaborate with retailers in last mile logistics. To achieve this aim, the study is guided by five objectives:

1. Identify relevant SCC and consumer cocreation literature that addresses antecedents of consumer motivation to collaborate in the SC.
2. Construct a generic framework that graphically represents the relationships between the identified antecedents.
3. Test this framework using empirical data.
4. Evaluate how effectively the framework explains consumer motivation to collaborate with retailers in last mile logistics and revise it accordingly.
5. Identify future research opportunities in this area.

This chapter addresses the first and second objectives. It begins by outlining the process and outcomes of the literature review and concludes with the rationale for the three hypotheses developed from the review findings.

A systematic literature review (SLR) process was conducted using the six-step paradigm proposed by Durach et al. (2017) for reviews in the SCM domain. This process begins with the development of a theoretical framework which is tested by iterative sampling and analysis of literature relevant to the study. In the final steps the initial theoretical framework is modified and the results reported. A descriptive analysis of the reviewed literature including publications trends and a review of the theories used to explain collaboration can be found in Appendix E

An initial baseline sample of 505 articles was gathered through an iterative process of search term trial. The baseline sample was reviewed and narrowed to a synthesis sample of 38 directly relevant articles and 100 relevant articles. Directly relevant articles were deemed to be those concerned with (1) supply chain collaboration (SCC) as defined by Cao and Zhang (2011), (2) the antecedents of SCC and (3) vertical collaboration. Relevant articles were those that exhibited characteristics (1) and (3) but were concerned with the outcomes rather than antecedents of SCC. These articles were included because their focus on outcomes may contain valuable insights into motivation to collaborate.

As anticipated, none of the articles obtained from the SCC literature considered the consumer as an active collaborator. The pool was therefore supplemented by selected articles from the consumer cocreation literature. The consumer cocreation articles were selected if (1) their prime focus is the antecedents or outcomes of consumer cocreation with businesses (B2C collaboration), (2) they comply with the conception of cocreation proposed by Grönroos and Gummerus (2014) and (3) they can provide insights to the proposed theoretical framework. On this basis, 16 articles were added to the pool to be considered for analysis.

The thematic analysis of the articles revealed four antecedent influences on consumer motivation to cocreate: (1) *Perceived value,* referring to consumers' expectation that the benefits of collaboration will outweigh the associated costs; (2) *Relationship strength* between consumers and businesses, which fosters consumers' willingness to share resources; (3) *Systems and processes,* which are fundamental to enabling collaboration, though their requirements differ for businesses and consumers; and (4) *Contextual factors,* such as the demographic profile of the actors, culture, risk and uncertainty and the products being exchanged. These antecedents are visually depicted in Figure 2.2.

The final section explains the rationale for the three hypotheses based on the first three themes identified in the literature. We do not develop a hypothesis to test the antecedent influence of

contextual factors as that conflicts with the objective of the study which is to test a generic framework of collaboration in the consumer domain of last mile logistics.

2.2 Review process

A systematic approach has been adopted for this review to capture all the relevant papers related to what motivates adoption of SCC. A systematic literature review (SLR) aims to synthesise a body of previous knowledge in a way that is both scientific and replicable by other researchers. Originally developed for medical research, SLR methodology was first adapted for business research by Tranfield et al. (2003). It is an iterative process in which keywords, search terms and filters are tested to generate the widest selection of the most directly relevant literature.

Durach et al. (2017) suggested a modified SLR approach to accommodate the ontological and epistemological idiosyncrasies of research in the SCM domain. They argued that SCM is a practical rather than theoretical discipline with permeable theoretical boundaries, inconsistent units of analysis and sources of data, variable study contexts, imprecise definitions, and variable research methods. We adopt their six-step paradigm which is based on a distillation of common SLR processes including those of Tranfield et al. (2003). The six steps are (1) developing an initial theoretical framework, (2) defining the primary study characteristics, (3) retrieving a baseline sample, (4) selecting a synthesis sample, (5) synthesising the literature, and (6) reporting the results. The Durach et al. (2017) paradigm has been used extensively in the SCM literature (e.g., Goudarzi et al., 2023; Pan et al., 2019; Vosooghidizaji et al., 2020). The following sub-sections discuss the first five steps of this paradigm for the review. The sixth step reporting the results of our review is presented in Section 2.3.

A PRISMA flow diagram that summarises the review process is presented in Figure 2.1

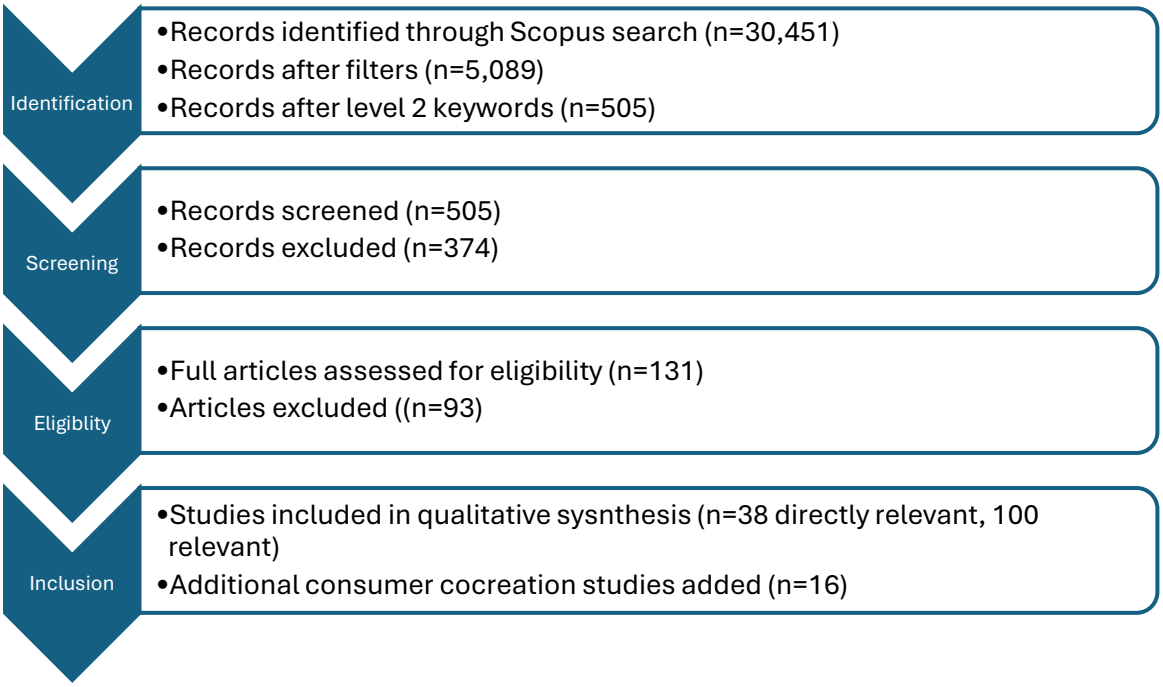

Figure 2. 1 PRISMA flow diagram

2.2.1 Step 1: Develop initial theoretical framework.

An initial theoretical framework is first proposed to guide selection, coding and synthesis of literature. This framework is then further refined through the SLR process. Our initial framework (Figure 2.2) is informed by a selection of SCC review articles sourced from the Scopus database. To identify the related review articles we used the search terms Supply AND Chain AND Collaboration for "abstract, title, keywords" search on Scopus, limited to review articles written in English and the subject areas of business, engineering, economics, decision sciences, and multidisciplinary. This search resulted in 324 review articles. Next, filters were applied to ensure the inclusion of articles from reputable sources only. The selection was focused on peer-reviewed journals recognised for their impact and standing, as measured by the Australian Business Deans Council (ABDC). For the purpose of our review, only review articles from journals ranked B and above were considered. This focus on high quality publications narrowed the pool to 95 articles, which were subsequently examined. We identified the most ten most relevant articles from this pool for the purpose of developing our initial framework. The characteristics of these articles are summarised in Table 2.1.

We were unable to find an existing SCC review article whose main focus was to identify the key drivers of motivation to engage in SCC. However, the selected articles provided useful guidance to understand the theoretical foundations and potential antecedents of SCC in general. The initial

theoretical framework is derived from examining these review articles. As illustrated in Figure 2.2, the proposed framework contains four antecedents of consumer motivation to collaborate in the SC: "perceived value", "relationships", "systems and processes" and "context", as discussed below.

The first element of the framework is "perceived value". Social exchange theory explains that actors in a network are motivated to act by the expectation of rewards (Emerson, 1976; Thibault & Kelley, 1959). Social behaviour is the result of an exchange process whose purpose is to maximise benefits and minimise costs. SCC engagement can therefore be motivated when superior value is offered by collaboration compared to traditional market mechanisms. The reviewed papers contain examples of the value generated by SCC (e.g., Duong et al., 2020), particularly through better utilisation of capabilities and resources, and improved finances in responding to and recovering from a disruption. In their review of the SCC literature, Ma et al. (2019) identify several outcomes of SCC including improved business performance from economic, effeciency and quality dimensions – all of which imply an economic motivation to collaborate.

The second element of the framework is "relationships". Social exchange theory further explains that over time regular exchange of value between partners will create interdependent relationships which means that companies become reliant on each other to achieve their business objectives. Relational factors like trust, commitment and reciprocity then become important influences of the motivation to collaborate. In their review of collaborative planning, forecasting and replenishment implementation studies, Hollmann et al. (2015) identify trust as an important enabler of collaboration. Duong and Chong (2020) identify trust as fundamental to SCC because partners need to be able to rely on each other to perform their duties. They further explain that a high level of trust leads to better collaborative relationships and to higher levels of SC performance.

The third element of the framework is "systems and processes". Transaction cost economics (Williamson, 1975, 2008) proposes that organisations can generate value through hierarchies or market mechanisms and that the choice should be made based on the relative transaction costs of each option. SCC allows firms to virtually integrate their organisations, acquiring best practice capability from each other without the cost and risk of building it by themselves. In addition, the systems and processes needed to sustain SCC provide mechanisms to monitor outsourced capability and provide protection from supplier opportunism (Kembro et al., 2014). Systems and processes therefore are an antecedent of the motivation to engage in SCC because of their dual

Table 2.1: Summary of the selected review articles

Article	Main Focus Areas	Summary
Dania, Xing and Amer (2018)	Behavioural factors that increase effectiveness of SCC in sustainable agri-SCs	Identifies 10 key behavioural factors that enable an effective collaboration system for sustainable agri-food SCs. The factors include Joint Efforts, Sharing Activities, Collaboration Value, Adaptation, Trust, Commitment, Power, Continuous Improvement, Coordination, and Stability.
Duong and Chong (2020)	SCC and disruption	Identifies themes and frameworks that show how SCC can be useful in recovering from SC disruptions.
Formentini and Romano (2016)	SCC and pricing	Identifies 4 streams clustered around two literature streams that discuss ways to adapt the pricing process in SCC.
Gebhardt, Kopyto, Birkel and Hartmann (2022)	Collaboration mechanisms that can be enhanced using Industry 4.0. Focus on circular SC.	Finds that information sharing and joint planning and decision-making are the most common collaboration mechanisms discussed in the literature and that the Internet of Things, Blockchain, and Cloud Systems are the most discussed technologies to enable those mechanisms.
Goudarzi et al. (2023)	Behavioural operations management and SC coordination management	Categorises studies of behavioural operations management and SCC including the theories used and methods applied.
Hollmann, Scavarda and Thomé (2015)	Collaborative Planning, Forecasting and Replenishment (CPFR)	Finds that CPFR is context-dependent and varies according to the SC configuration. Trust, information-communication technology, and the quality of information sharing are the main enablers and inhibitors of implementation.
Katsaliaki, Kumar and Loulos (2024)	Horizontal collaboration between rival manufacturers to leverage SC capabilities and functions.	Develops a thematic framework for classifying reviewed papers in terms of SCC structures, mechanisms and dynamics.
Kembro, Selviaridis and Näslund (2014)	Information sharing theories	Finds that 4 out of 10 published articles explicitly apply one or more theories to explain information sharing in SCC. The predominant theories used include transaction cost economics, contingency theory, resource-based view, resource dependency theory and relational governance theories such as the relational view and social exchange theory.
Ma, Pal and Gustafsson (2019)	Modelling research in SCC	Identifies 4 categories in the SCC literature: information sharing, joint decision making, resource sharing, and co-ordinating contracts. Finds that 70% of reviewed articles involve modelling.
Soosay and Hyland (2015)	Thematic analysis of 10 years of SCC studies (2005–2014) and research agenda	Key themes identified include the meaning of collaboration; SC collaboration theories used; emerging areas in collaboration such as sustainability, technology-enabled SCs and humanitarian SCs; and emerging SCC research areas.

role in both facilitating SCC and monitoring engagement. Hollmann et al. (2015) identify information-communication technology and the quality of information sharing as the main enablers of collaboration implementation. In their review of information sharing in SCs, Kembro et al. (2014) find that transaction cost economics is the theory most frequently used to explain the role of information sharing.

The fourth element is "context". Transaction cost economics (Williamson, 1975, 2008) also suggests that uncertainty in various forms can increase transaction costs and influence the choice of hierarchical or market mechanisms. Many types of uncertainty exist in SCs including market, technological and geopolitical, all of which are contextual influences that can be mitigated by the adoption of SCC. Hollmann et al. (2015) find that market dynamics, goals of the process, scope of the initiative (e.g., number of products, number of partners), and the spatial complexity of the SC are all contextual influences that can affect implementation of a program and its effect on business outcomes.

Based on these factors identified in the previous literature, we propose the following initial theoretical framework (Figure 2.2).

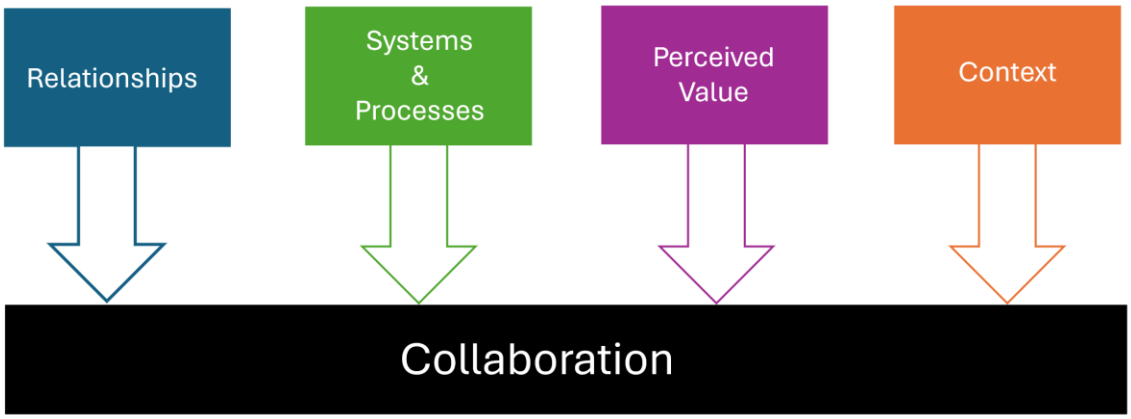

Figure 2.2: Initial theoretical framework

2.2.2 Step 2: Define characteristics of primary studies

Step 2 of the Durach et al. (2017) paradigm requires developing criteria for identifying publications that can provide relevant information to enhance or refine the initial framework. We determined the characteristics of relevant studies applying the following criteria.

- Many studies have attempted to separate SCC from other concepts like cooperation, coordination and integration, yet SC researchers continue to be inconsistent in their use of these terminologies (Soosay & Hyland, 2015). Therefore, we decided to avoid definitional precision, and instead focused on studies that are concerned with the characteristics of SCC as described by Cao and Zhang (2011). These characteristics are goal congruence, information sharing, resource sharing, decision synchronisation, and incentive alignment. Studies that are investigating different phenomena like SC integration, collaborative commerce, collaborative joint efforts, electronic SCM, electronically mediated exchange, and others have been included in scope if the activity described in the study has the characteristics of SCC described by Cao and Zhang.
- The SCC literature can be categorised into three parts: antecedents, activities, and consequences (Lee et al., 2010). Articles primarily concerned with the antecedents of SCC were considered 'directly relevant' to this study. Articles on the consequences or outcomes of SCC were considered in a separate 'relevant' category as they could imply or provide insight into motivation to collaborate. Articles on the activities of SCC being the management of established SCC relationships were considered outside the scope of this review.
- SCC can be vertical (between actors at different levels in a SC) or horizontal (between actors at the same level in the SC). Our proposed framework is one of vertical collaboration (supplier–customer), so articles on horizontal collaboration were not included in the review.

2.2.3 Step 3: Identify baseline sample

Step 3 requires identifying a pool of potentially relevant literature through a series of structured searches. This is known as the "baseline sample" (Durach et al., 2017). We used Scopus as the primary database to identify the related articles. The search was performed in January 2024. The search terms were developed iteratively in a number of stages.

Stage 1: To create an initial pool of potentially relevant articles a search was conducted based on the search terms and filters used by Soosay and Hyland (2015) in their review of the SCC literature (Table 2.2). These search terms and filters were adopted because they were designed to generate a general selection of articles concerned with SCC rather than a specific domain, subtopic or method. The search terms were modified to include an extended date range, the journal quality filter already adopted for the search for reviews and more specific keyword filters

Table 2.2: Search process based on Soosay and Hyland (2015)

Limited to	Database	Scopus	
	Language	English	
	Date range	None	
			Article Count
Search terms	Article title, abstract, keywords	"Collaboration", "Supply Chains", "Supply Chain Management" and "Supply Chain Collaboration"	4,961
Filters	Type	Journal Article	2,816
	Disciplines	Business Management and Accounting, Engineering, Decision Sciences, Social Sciences, Economics, Econometrics and Finance, Multidisciplinary	2,455
	Keyword filters	'collaboration' , 'supply chain collaboration' 'collaborative relationships', 'supplier collaboration', 'collaborative strategies'	586
	Journal rank	ABDC ranked B or above	256

The search yielded 256 articles which were examined for relevance based on the criteria established in Section 2.2. Nine articles were considered to be directly relevant to this study. These articles all considered perceived value, relationships, systems and processes, or context as antecedents of motivation to engage in SCC (Table 2.3). A detailed analysis of these articles was conducted to develop an enhanced set of search terms.

Stage 2: The initial pool of nine directly relevant articles was examined to create a structured set of search terms and filters. We organised the search terms and filters as follows. Level 1 search terms were selected to capture all articles that may be concerned with SCC. Filters were applied to ensure only articles from relevant and useful sources were retained. Level 2 search terms were selected to concentrate the search specifically on articles concerned with the antecedents of motivation to engage in SCC.

Table 2.3: Initial pool of potentially directly relevant articles

Authors	Keywords	Percei--ved Value	Relations -hips	Systems & processes	Context
Acquah, Naude and Sendra-García (2021)	Supply chain collaboration, culture, trust, petroleum downstream, PLS-SEM, fsQCA		✓		
Chae, Yen and Sheu (2005)	Information technology, interorganisational information systems (IOSs), supplier-retailer relationship, supply chain collaboration, supply chain management.		✓	✓	
Chen, Lin and Yen (2014)	Shared goal, relational embeddedness, influence strategy, trust, collaboration, knowledge sharing, relationship marketing		✓		
Lee, Kim, Hong and Lee (2010)	Supply chain dynamics, supply chain management, collaboration, information sharing	✓	✓	✓	✓
Lindsey Hall, Qi, Richey Jr. and Patil (2022)	Collaboration, supply chain, innovation, feedback, service-dominant logic, learning, logistics performance, supply chain management, resilience	✓	✓	✓	
Lockström, Harrison, Moser and Malhotra (2010)	Supplier integration, China, automotive, collaborative relationship		✓	✓	
Nyaga, Whipple and Lynch (2010)	Collaborative relationships, commitment, trust, satisfaction, supply chain alliances, invariance testing	✓	✓	✓	
Richey, Adams and Dalela (2012)	Collaboration, flexibility, retail, technological innovativeness, technological complementarity, time	✓		✓	
Wu, Chuang and Hsu (2014)	Supply chain management, social exchange theory, information sharing, collaboration, Supply chain performance	✓	✓	✓	✓

Level 1: Despite many attempts in the literature to distinguish SCC from more formalised inter-organisational collaboration structures such as joint ventures and strategic alliances as well as looser arrangements like cooperation and coordination, in practice, definitional issues remain (e.g., Ma et al., 2019; Soosay & Hyland, 2015). This means search terms that may not fit strict definitions of SCC are required to find SCC articles. As such, we use the terms "coordination" and "cooperation" in conjunction with various combinations of the terms "supply", "chain" and "collaboration". A similar approach has been adopted in some of the selected review articles included in Table 2.1

(e.g., Dania et al., 2018; Duong & Chong, 2020; Goudarzi et al., 2023; Katsaliaki et al., 2024; Ma et al., 2019). The phrase "information sharing" was also added to level 1 on the basis that any article that discusses information sharing in an SC context is potentially relevant to our focus area. Information sharing is also a keyword in some of our directly relevant articles (Amer et al., 2010; Wu et al., 2014). The term "cocreation" is associated with the marketing literature, but it is also closely related to SCC. Alves et al. (2016) and Lusch (2011) explain the applicability of cocreation and their service dominant logic principles to SCM. Following these articles, service dominant logic principles have been used in many articles (Altuntas Vural, 2017). The word "cocreate", in various spellings, was therefore also added to level 1. The resulting level 1 search terms are as follows:

> "Supply chain" AND collabo* OR co-operat* OR cooperat* OR coordinat*
> OR "information sharing" OR (cocreat* OR co-ocreat* OR co AND creat*)

The search in the Scopus database using these search terms generated 30,451 articles. The source filtering focused on 48 journals that were ranked B and above on the ABDC journal ranking list. This meant that the discipline filter was no longer required. Applying the source filter reduced the number of articles to 5,089.

Level 2: We needed additional keywords to further narrow the scope of our search to papers focusing on the antecedents of SCC. The level 2 search terms were first tested informally to allow for grouping and spelling changes then tested sequentially for effectiveness. Only search terms that were effective in identifying potentially directly relevant articles were retained. The potential relevance of articles was determined by manually reviewing titles and abstracts of the search results. Search terms that identified potentially relevant articles, but not potentially directly relevant articles, were rejected. For example, the words "culture" and "driver" generated an additional 193 articles, but none that were potentially directly relevant. Any potentially directly relevant article found in the testing of level 2 keywords was noted and reserved for manual addition to the pool if not found by further revisions of the search. The final level 2 search terms were "antecedent", "enabler" and "trust". The importance of trust as an influencer on SCC is identified in the selected review articles (Dania et al., 2018; Hollmann et al., 2015) and is used as a keyword in three of the nine articles in the initial pool of directly relevant articles (Table 2.3). More importantly, trust is tested as an influencer on SCC in seven of the nine articles in the initial pool with only Lindsey Hall et al. (2022) and Richey et al. (2012) not explicitly testing its effects.

Applying level 2 keywords to the search mechanism reduced the pool to 505 articles. The steps toward developing the baseline sample are shown in Table 2.4. The same search process was also repeated in the INFORMS and Web of Science databases, but no further relevant articles were identified.

Table 2.4: Development of baseline sample

			Article Count
Level 1: Identifying articles in the SCC domain	"Title, Abstract, Keywords" search on Scopus	"supply chain"	30,451
		AND	
		collabo* OR co-operat* OR cooperat* OR coordinat* OR "information sharing" OR (cocreat* OR co-creat* OR co AND creat*)	
		AND	
Filters	Document type	Journal article	18,970
	Language	English	17,621
	Source title (ABDC rank 'B' and above)	48 journals	5,089
		AND	
Level 2: Identifying potentially 'directly relevant' articles	Article title, Abstract, keywords	Antecedent	136
		OR	
		enabler	113
		OR	
		trust	256
		Sub Total (baseline sample)	**505**

2.2.4 Step 4: Synthesise sample for analysis

In step 4, a detailed relevance test of the baseline sample is conducted to develop the final synthesis sample. All potentially directly relevant and relevant articles from the sample were examined again to confirm they met the inclusion criteria. Potentially directly relevant articles were read in full. On the basis of this review, 34 articles were found to be directly relevant and 97 relevant to the focus of this review.

Several manual additions were made to the synthesis sample on the following basis. Articles not found by the final baseline search terms but found to be potentially directly relevant in the testing of rejected search terms were re-examined for inclusion. An additional search was conducted for other work of authors with more than two articles in the directly relevant group and examined for

relevance. A total of four directly relevant and five relevant articles were identified through this process which were then added manually to the synthesis sample. The final composition of the synthesis sample can be seen in Table 2.5.

Table 2.5: Development of synthesis sample

Baseline sample Level 2 search term	Articles reviewed	Directly relevant	Relevant	Total
Antecedent	136	16	26	42
Enabler	113	6	18	24
Trust	256	12	53	65
Sub Total	505	34	97	131
Manual additions	Not found by baseline search terms	3	0	3
	Prolific authors	1	3	4
Sub Total		4	3	7
Total synthesis sample		**38**	**100**	**138**

Consumer collaboration: The search terms used for the baseline sample generated no articles on consumer collaboration. The synthesis sample therefore reflects only B2B SCC behaviour. An additional search was conducted to find articles from the B2C domain of consumer cocreation. The search was limited to articles that could provide additional insights into the initial theoretical framework (Figure 2.1) developed from the SCC literature. The consumer cocreation articles were selected using the following three criteria. (1) Their prime focus is the antecedents or outcomes of consumer cocreation with businesses (B2C collaboration). (2) They comply with the conception of cocreation proposed by Grönroos and Gummerus (2014) as a process of interaction between actors where their processes merge into a "collaborative, dialogical process". We accepted articles that used alternative words to describe cocreation such as "co-production" and "prosumption" if they aligned with the Grönroos and Gummerus (2014) conception of cocreation. (3) Articles ranked for quality using the ABDC journal ranking list at B or above. A total of 16 directly relevant articles were found using this criteria and their contents are summarised in Table 2.7. The consumer cocreation articles were not included in the synthesis sample and not analysed in the descriptive section of this review as they were not derived through the SLR process. However, they are included in the thematic analysis.

2.2.5 Step 5: Synthesise the literature

Step 5 requires synthesising the sample using two parallel coding structures. Durach et al. (2017) recommend one coding structure which covers ontological and epistemological elements, while

the other covers each article's relationship to the elements of the framework. The first coding structure captured ontological categories such as publication date, source journal, geographic context, and epistemological elements relating to the theories and methods used. The second coding structure captured the relationship of each directly relevant article to elements of the framework, the constituent parts of each element and the interplay between the elements. Together the two coding structures allowed us to determine in what circumstances motivation to collaborate in the SC occurs, what theories best explain the motivation to collaborate, and whether methodological differences affect outcomes. More importantly, they allowed us to refine and revise the initial theoretical framework and address the research objectives. The synthesised directly relevant SCC literature is summarised in Table 2.6. The consumer cocreation literature is coded in a similar way and summarised in Table 2.7.

Table 2.6: Characteristics of the directly relevant articles

	Ontological and epistemological characteristics					Relationship to elements of the framework			
Authors	**Industry**	**Focus**	**Theories**	**Method**	**Sample size**	**Perceived Value**	**Relation-ships**	**Systems & processes**	**Context**
Acquah et al. (2021)	Petroleum	Collaborative culture and trust as antecedents of SCC	Resource-based theory, transaction cost economics	Survey	166		✓		✓
Afshan et al. (2018)	Manufacturing	Impact of IT and relational factors on SCC		Survey	166	✓	✓	✓	
Aloini et al. (2015)	Manufacturing (yacht)	Antecedents of SCC		Case	1	✓	✓	✓	
Chae et al. (2005)	Retail	Effects of IT and relational factors on SCC		Case	5		✓	✓	
Chatha et al. (2023)	Manufacturing	Effects of external, organisational, and technological environments on SC integration	Sociotechnical systems theory, technological organisational environment framework.	Survey	307	✓		✓	✓
J. V. Chen et al. (2014)	Automotive parts	Effects of information, organisation, and environment on SCC commitment		Survey	233	✓	✓	✓	✓
Y.-H. Chen et al. (2014)	Multiple industries	Antecedents of knowledge sharing and effects on SCC		Survey	226		✓		
Chengalur-Smith et al. (2012)	Multiple industries	Antecedents and effects of deploying interorganisational systems		Survey	89	✓	✓	✓	✓
Chong et al. (2013)	Small to medium enterprises	Factors affecting 'e-collaboration' adoption		Survey	136		✓		
Pimentel Claro et al. (2006)	Flowers	Effect of trust and transaction specific investments on SCC and the moderating effect of the information network	Transaction cost economics, relational exchange theory, network theory	Survey	67	✓	✓	✓	

Ontological and epistemological characteristics						Relationship to elements of the framework			
Authors	**Industry**	**Focus**	**Theories**	**Method**	**Sample size**	**Perceived Value**	**Relation-ships**	**Systems & processes**	**Context**
de Leeuw and Fransoo (2009)	Wholesale/retail	Antecedents of SCC		Case	3		✓		✓
S.E. Fawcett et al. (2012)	Multiple industries	Motivators, resistors and enablers of SCC		Case	50	✓	✓	✓	✓
Fawcett et al. (2008)	Multiple industries	Benefits, barriers and bridges to successful collaboration in strategic SCs		Survey/ Case	254/51	✓	✓	✓	
Gligor and Holcomb (2014)	SC managers	Development of logistics collaboration and effects on performance		Survey	151	✓	✓	✓	
Hung et al. (2011)	Multiple industries	Information sharing effects on SC uncertainty and performance		Survey	122	✓	✓	✓	
Lee et al. (2010)	Manufacturing	Antecedents and consequences of SCC		Survey	251	✓	✓	✓	✓
Lindsey Hall et al. (2022)	Retail/manufacturing	Collaborative feedback and resource investments effect on the establishment of SCC and logistics service performance	Service dominant logic	Survey	264	✓	✓	✓	
Lobo et al. (2013)	Agriculture	Effects of guanxi (networks) and xinyong (interpersonal trust) on SCC		Survey	520	✓	✓		
Lockström et al. (2010)	Manufacturing (automobile)	Factors that facilitate and inhibit SC integration		Case	30	✓	✓	✓	✓
Mora-Monge et al. (2019)	Multiple industries	Effects of trading partner trust and trading partner power on SC integration, engagement, and performance	Resource-based view, dynamic capabilities view, social capital theory	Survey	175	✓	✓		

Ontological and epistemological characteristics						Relationship to elements of the framework			
Authors	**Industry**	**Focus**	**Theories**	**Method**	**Sample size**	**Perceived Value**	**Relation-ships**	**Systems & processes**	**Context**
Myhr and Spekman (2005)	Manufacturing	SCC engagement under varying transactional types	Relational contracting theory, organisational information processing theory	Survey	150		✓	✓	✓
Narasimhan and Nair (2005)	Multiple industries	Development of buyer – supplier relationship architecture		Survey	411	✓	✓	✓	
Nyaga et al. (2010)	Multiple industries	Antecedents and benefits of SCC		Survey	370/290	✓	✓	✓	
Panahifar et al. (2018)	Multiple industries	Interrelationship between information sharing and trust in SCC		Survey	189	✓	✓	✓	
Richey et al. (2012)	Retail	Adopting collaborative approaches in reverse logistics operations	Transaction cost economics, resource-based view	Survey	170	✓		✓	
Ryu et al. (2009)	Multiple industries	Antecedents of SCC and effects on performance		Survey	141	✓	✓	✓	
Salam (2017)	FMCG (food and beverage)	Relationship between trust, technology and SCC and their effect on performance		Survey	181	✓	✓	✓	
Sanders and Premus (2005)	Manufacturing	Effect of information sharing on SCC and firm performance		Survey	245	✓		✓	
Sheu et al. (2006)	Retail	Effects of social and technical factors on SCC engagement and performance		Case	5	✓	✓	✓	✓
Srivastava et al. (2015)	Manufacturing	Relational resource antecedents of SCC	Relational view	Survey	115	✓	✓	✓	✓
Tsanos and Zografos (2016)	Manufacturing	Behavioural antecedents of information sharing in SCC	Relational exchange theory, social exchange theory, resource-based view	Survey	162	✓	✓	✓	

Ontological and epistemological characteristics						Relationship to elements of the framework			
Authors	**Industry**	**Focus**	**Theories**	**Method**	**Sample size**	**Perceived Value**	**Relation-ships**	**Systems & processes**	**Context**
Vlachos et al. (2008)	Retail/manufacturing (food)	Motivation of manufacturers and retailers to collaborate		Survey	71		✓	✓	
W.-T. Wang et al. (2023)	Multiple industries	Effects of relationship quality, behaviour, and dynamic capability on SCC	Commitment-trust theory, dynamic capabilities view	Survey	366	✓	✓		
Wu and Chiu (2018)	Manufacturing + service	Antecedents of SCC	Social capital theory, justice theory, DeLone and McClean model of IS success	Survey	206	✓	✓	✓	✓
Wu and Chuang (2010)	Manufacturing + service	Tests a model of SCC engagement and performance	Innovation diffusion theory	Survey	184	✓		✓	
Wu et al. (2014)	Manufacturing + service	Antecedents and effects of "e-SCM" adoption	Social exchange theory	Survey	177	✓	✓	✓	✓
Zander et al. (2016)	Wood industry	Drivers of network governance (collaboration)	Transaction cost economics, resource-based view, relational view, learning theory, institutional theory	Case	5	✓	✓	✓	✓
Zhang and Cao (2018)	Multiple industries	Impact of collaborative culture and IOS use on SCC	Relational view, extended resource-based view	Survey	211	✓	✓	✓	✓

Table 2.7: Characteristics of the related studies from the cocreation literature

	Ontological and epistemological characteristics					Relationship to elements of the framework			
Authors	**Industry**	**Focus**	**Theories**	**Method**	**Sample size**	**Perceived Value**	**Relationships**	**Systems & processes**	**Context**
Akman et al. (2018)	Innovation communities	New product development	Service dominant logic	Survey	309	✓	✓		✓
Alimamy and Gnoth (2022)	Retail	Augmented reality enabled online shopping	Service dominant logic	Survey	375/408	✓	✓		✓
Alves and Mainardes (2017)	Multiple industries	Cocreation behaviour	Service dominant logic, social exchange theory, social-cognitive theory, trust commitment theory	Survey	372	✓	✓	✓	
Bettiga et al. (2017)	Food	New product development	Stimulus organism response	Survey	180	✓			✓
Chatterjee et al. (2023)	Multiple industries	Co-production intention	Service dominant logic, theory of value creation	Survey	351	✓	✓	✓	✓
Füller and Bilgram (2017)	Innovation communities	New product development	Flow theory, experience management, relationship management	Survey	727		✓	✓	✓
Grott et al. (2019)	Banking	Cross cultural outcomes of cocreation	Service dominant logic	Survey	224	✓			✓
Hussain et al. (2021)	Restaurant	Cocreation experience	Service dominant logic, engagement theory	Survey	421	✓	✓		
Im and Qu (2017)	Restaurant	Drivers and resources of cocreation	Social cognitive theory	Survey	501			✓	✓
Kamboj et al. (2018)	Brand communities	Brand cocreation	Stimulus organism response	Survey	407		✓		✓
Kennedy et al. (2022)	Social media (Nike)	Gender and cocreation motivation		Experiment	188-120	✓			✓
Mainardes et al. (2017)	Banking	Cocreation motivations	DART	Survey	265			✓	✓

	Ontological and epistemological characteristics					Relationship to elements of the framework			
Authors	**Industry**	**Focus**	**Theories**	**Method**	**Sample size**	**Perceived Value**	**Relationships**	**Systems & processes**	**Context**
Roberts et al. (2014)	Online gaming	Product development		Interviews	17	✓			✓
Wallace et al. (2021)	Social media	Intention to cocreate on social media		Survey	332		✓		
X. Wang et al. (2023)	Last mile logistics	Consumer last mile logistics cocreation		Survey	500	✓			
Zare et al. (2018)	Cross industry	New product development		Survey	509	✓		✓	✓

2.3 Thematic analysis

This section reports the results of a thematic analysis of the articles, separately for each of the framework elements. The analysis is drawn from the pool of directly relevant SCC articles as well as insights from the consumer cocreation literature. For each element, we identify subcomponents and analyse the interplay between them. In addition, we analyse the interplay between the main elements themselves. Finally, we present a revised framework that focuses specifically on consumer motivation for SCC and graphically depicts the results of our analysis.

2.3.1 Perceived value

Of the 38 directly relevant papers, 27 measure the positive contribution to value through engagement in SCC. Our analysis identified three categories of perceived value: (1) overall firm performance, (2) financial performance and non-financial performance, and (3) competitive advantage. Each category has subcomponents which are identified and discussed below.

Overall firm performance: Overall firm performance is shown to benefit from engagement in SCC in several studies. Using survey and structural equation modelling, Panahifar et al. (2018) and Mora-Monge et al. (2019) found that collaboration has a strong and significant effect on business performance. Neither study measured the components of business performance separately, although Panahifar et al. (2018) conceptualised it at the design stage as a combination of sales growth and operational performance. The scale used to measure performance by Mora-Monge et al. (2019) included items measuring relative performance to competition, relationships in the channel, and improved products and services. Sheu et al. (2006) tested the effects of collaboration on firm performance using case studies. By examining six paired retailer–supplier cases, they found that those pairs with higher levels of collaboration have superior business performance. A mix of quantitative and qualitative measures were used to assess relative performance of the pairs including inventory level, order fill rate, the percentage of returned goods, and a subjective evaluation of the overall satisfaction with the relationship by managers.

The effect of SCC on more specific aspects of firm performance was measured in some studies. For example, Srivastava et al. (2015) and Salam (2017) investigated the effect of SCC on operational performance, while Ryu et al. (2009) investigated the effect on the overall SC performance. All these studies identified similar strong and significant positive effects. However, on closer investigation, there is a degree of overlap between the measures with both operational performance and SC performance including measures of delivery lead times and SC costs.

Operational value and SC value were inconsistently defined in these articles, but their strong relationship with SCC engagement was consistently demonstrated.

Two studies confined their scope to logistics performance. Lindsey Hall et al. (2022) conceived logistics performance as "efficiency, effectiveness, and differentiation" and found that inter-firm collaboration has a strong and positive effect. Richey et al. (2012) measured the effect of collaboration on time-based logistics performance and also found strong and positive effects.

Financial performance and non-financial performance: Several studies focused specifically on the financial performance effects of engagement in SCC. For example, Afshan et al. (2018) tested the effect of SCC on financial performance of the collaborating firms. Using a scale containing profitability ratios they demonstrated a positive relationship between SCC and financial performance. In three studies, Wu and Chuang (2010), Wu et al. (2014) and Wu and Chiu (2018) measured the effect of SCC on financial performance and non-financial performance simultaneously. The financial performance scales in these studies included profitability ratios (return on investment, return on assets), revenue and costs, while the non-financial performance scales included measures of responsiveness and quality. In all three studies, financial performance and non-financial performance were shown to be strongly influenced by SCC.

Overlap can be observed between the measures of financial and non-financial performance and the measures of firm performance already observed. Common items in the scales included sales revenue, cost control and responsiveness. Lobo et al. (2013) also noted the financial and non-financial impacts of SCC. In their study conducted among Chinese vegetable farmers, they found that collaboration was positively associated with improved financial performance and also with improved SC relationships measured by wholesaler loyalty to their suppliers. The impact of SCC on relationships was also demonstrated in a longitudinal study by S.E. Fawcett et al. (2012) who showed that improved SC relationships were one of the long-term benefits of collaboration.

Competitive advantage: The effect of SCC on competitive advantage is predicted by resource-based theory but rarely tested in the literature. The resource-based view proposes that a firm's competitive advantage is linked to the resources at its disposal (Barney, 1991). The dynamic capabilities view (Teece 2007) extends the resource-based view by proposing that competitive advantage can be achieved when businesses acquire collections of processes and sensing capabilities that allow an organisation to react quickly to threats or opportunities in the market. Wang et al. (2023) showed that collaborative commerce behaviour not only positively influences business performance but enhances its dynamic capabilities and thereby competitive advantage.

All the perceived value types identified in the literature relate to efficiency and effectiveness which are dimensions of economic value (Holbrook, 1999; Holbrook, 2006). There are no studies that suggest engagement in SCC is motivated by other forms of value such as altruism which has been identified as an antecedent of engagement in the circular economy (De Vass, Nand et al., 2023) and supplier selection in a social sustainability context (Thomas, Darby et al., 2021).

Consumer cocreation: The consumer cocreation literature also shows that collaboration is motivated by perceived value. However, there are some differences between the types of value that motivate consumers and those that motivate businesses. Businesses derive similar value from consumer collaboration as they do from collaborating with other businesses. Grott et al. (2019) found that cocreation in the banking sector leads to increased customer satisfaction, brand loyalty, and ultimately increased profitability.

Consumers derive economic value from collaboration, but they also derive additional types of value compared to businesses. Zare et al. (2018) found that economic value in the form of monetary rewards is the most important motivating factor for consumers engaging in cocreation. Roberts et al. (2014) showed that when online gamers cocreate with game producers, they are motivated by the economic reward of potential career opportunities with those companies. Another form of economic value generated by cocreation is personalisation of the product or service experience. Alimamy and Gnoth (2022) found that perceived personalisation of web shopping experiences significantly influences consumers' intention to cocreate. In the last mile logistics domain, X. Wang et al. (2023) showed that consumers' ability to individualise the delivery experience by picking up from a store or a locker, at a time and place of their choice, motivates their willingness to cocreate that service.

Other types of value not cited in the SCC literature have been shown to influence consumers' motivation to cocreate. Hedonic value has been defined as "pleasure in consumption experiences appreciated for their own sake as ends in themselves" (Holbrook, 2006 p.716). Social value is realised when "one's own consumption behaviour serves as a means to shaping the responses of others" (Holbrook, 2006 p.716). In a study conducted in the Chinese restaurant sector, Hussain et al. (2021) showed that hedonic, social and economic value derived from a cocreation experience positively influenced customer satisfaction, emotional brand attachment, and customer brand engagement. Altruistic value is defined as how one's own consumption behaviour affects others, an experience that is "viewed as a self-justifying end-in-itself" (Holbrook, 2006 p. 716). Bettiga et

al. (2017) showed that both social and altruistic values motivate consumers to cocreate in online food brand communities with altruism value playing a more significant role than social value.

2.3.2 Relationships

Of the directly relevant articles, 35 considered the antecedent effect of relationships on engagement in SCC, and the effects were measured in 31 out of 38 articles. The two most frequently discussed relational influences on SCC discussed in the literature are trust (22 articles) and commitment (9 articles), although other relational influences are also discussed.

Trust. Chong et al. (2013) identified trust as the most important factor in collaborative commerce adoption. Claro et al. (2006) found that when trust is high, SC relationships tend to be more collaborative in nature. Stanley E. Fawcett et al. (2012) concluded that without a foundation of trust collaborative alliances cannot be built or sustained. In several studies, trust is broken down into component parts. Acquah et al. (2021) tested the effects of "benevolence" (i.e., the expectation of impartiality and fairness) and "credibility" (i.e., dependability, consistency, genuineness and honesty), finding that both have a significant and positive influence on SCC. Mora Monge et al. (2019) added a third component "integrity" (i.e., the expectation of good faith and fulfilled promises), demonstrating that all three components have a significant effect on trading partner trust which in turn influences SC integration.

The direct influence of trust on SCC has been demonstrated in various contexts. For instance, Salam (2017) demonstrated a very strong and significant relationship between trust and collaboration using data collected in the food and beverage sector in Thailand. Ryu et al. (2009) demonstrated a similar effect using data collected from cross industry buyer supplier practitioners in South Korea, and Myhr and Spekman (2005) demonstrated the direct effect of trust in fostering collaboration, particularly of customised product manufacturing, using data collected from international subsidiares of Nordic multinational corporations.

Commitment. By, definition, commitment represents a higher level of relationship between actors than trust, but is also a logical progression from it. The hierarchical relationship between trust and commitment is demonstrated in a number of studies including Tsanos and Zografos (2016) and Ryu et al. (2009). Commitment trust theory (Morgan & Hunt, 1994) explains that commitment represents partners' desire to invest in a relationship so that it may continue in the long term. Both commitment and trust facilitate access to resources through cooperation and information and knowledge sharing which, in turn, reduces conflicts, opportunism and

uncertainty. The relationship between trust and commitment can also be explained by social exchange theory. Afshan et al. (2018) used social exchange theory to explain that SC collaborators in a trusting relationship will express their desire for continuity through a social exchange in the form of commitment, and demonstrate its direct influence on collaboration. The direct effect of commitment on SCC is also demonstrated by Ryu et al. (2009).

Commitment, like trust, has subcomponents. Tsanos and Zografos (2016) conceived commitment as a two-dimensional construct comprising the cognitive dimension "continuance commitment" and the emotional dimension "affective commitment". Wang et al. (2023) tested four dimensions of commitment: affective (emotional desire to remain in a relationship), positive calculative (benefits based assesment of the relationship), negative calculative (based on lack of alternatives), and normative (based on obligations). All were shown to have a significant direct influence on SCC.

Other relational factors. While trust and commitment are the most frequently discussed relational infuences on SCC, other influences have also been tested in the literature.

- Interdependence, according to social exchange theory, is an outcome of collaboration but it can also be a motivating factor in enagagement. Ryu et al. (2009) showed that interdependence has a strong and positive effect on commitment which in turn influences collaboration. Sheu et al. (2006) showed that relationship intensity, together with trust and interdependence, influence the deployment of the necessary systems and processes that facilitate collaboration.
- The alignment of goals, strategy and vision between actors can also influence engagement in SCC. For example, Ryu et al. (2009) showed that strategy fit has a strong and positive effect on commitment which in turn influences collaboration. Lee et al. (2010) demonstrated the strong and significant effects of goal compatability on collaboration.
- Personal relationships can also influence the motivation to enagage in collaboration. In their study of SC collaboration by Chinese vegetable farmers, Lobo et al. (2013) showed that interpersonal networks (guanxi) have a strong and significant influence on collaboration.

Consumer cocreation: The literature of consumer cocreation acknowledges the importance of relationships in motivating collaboration. The same themes of trust, commitment and alignment emerge; however, the relationships consumers form with businesses are with brands rather than

with individuals (Fournier, 1998). Various types of brand relationship are shown to influence motivation to collaborate. Brand trust is a two-dimensional concept that assumes both a cognitive assessment by the consumer of a brand's reliability to perform its functional tasks and an emotional assessment that the brand will act with the best of intentions toward the consumer (Delgado-Ballester, 2004). Brand loyalty is another two-dimensional concept consisting of a behavioural dimension, usually measured by repeat purchases, and an attitudinal dimension, usually measured by intention to purchase or willingness to recommend (Jones & Taylor, 2007). Brand love represents a higher level of relationship in the same way that commitment relates to a higher level of relationship in the B2B literature. Brand love has three dimensions – passion, intimacy and commitment, and has been described as the most intense relationship consumers can have with a brand (Schmid & Huber, 2019). In a study of brand communities on social media, Kamboj et al. (2018) found that both brand trust and brand loyalty positively influence branding cocreation. Similarly, Wallace et al. (2021) found that consumers who trust the brand are more willing to cocreate value on social media. They also find that these effects are enhanced when the brand is loved.

The consumer cocreation literature, like the SCC literature, demonstrates that improved relationships can also be an outcome of collaboration. In a study of consumer cocreation in new product development, Füller and Bilgram (2017) showed that an enjoyable cocreation experience leads to improved brand trust, brand image and word of mouth support for the brand. In another similarity to the SCC literature, the perceived alignment of values between consumers and brands also influences intention to cocreate. Akman et al. (2018) showed that shared vision between consumer and brand predicts cocreation behaviour, while Kennedy et al. (2022) demonstrated that when personal values of the consumer and brand align, in terms of important beliefs, it strongly influences cocreation activity.

2.3.3 Systems and processes

Most of the directly relevant articles (32 of 38 articles) discuss the influence of systems and processes on SCC. Some studies focus primarily on the influence of information technology, while others take a broader perspective. The most frequently discussed systems and processes influences are information sharing (11 articles) and interorganisational systems (9 articles) although other factors such as partnership investments are also discussed. Another theme of the literature is the interplay between system and processes and relationships. Some studies show systems and

processes influence relationships, while others show relationships influencing systems and processes.

Information sharing. SCC as a concept did not emerge before electronic methods of sharing information became available to companies like Walmart and Procter and Gamble (Grean & Shaw, 2002). Its direct effect on SCC is examined in a number of contexts. For example, in a study using data collected from Indian manufacturers (Afshan et al., 2018) and another using data collected from Malaysian small to medium enterprises (Chong et al., 2013) similar strong and positive antecedent effects of information sharing on collaboration were found.

Lee et al. (2010) tested the effects of sharing different types of information. Operational information includes short-term order, delivery, inventory and production information; while strategic information includes long-term pricing strategy, demand forecast, new product development, technology development, and marketing strategy information. They find that operational information sharing has a significant positive effect on operational collaboration, while strategic information sharing has a significant positive effect on strategic collaboration. In turn, both operational and strategic information sharing influence business efficiency.

Panahifar et al. (2018) tested the effect of the quality of information shared measured by its security, accuracy and readiness on collaboration, finding that security and readiness were significant influences, but accuracy was not.

Interorganisational systems. Information sharing between organisations is facilitated by the technology that connects them. Sanders and Premus (2005) found that a firm's IT capability has a strong and positive effect on both internal and external collaboration. Richey et al. (2012) called technology "the great enabler of collaboration" and, in line with the resource-based view, an important organisational resource in itself. In their study of the factors influencing retailer collaboration in reverse logistics, higher levels of technological complementarity were found to directly influence higher levels of collaboration. Furthermore, higher levels of technological complementarity also enable retailers to innovatively use technology to increase collaboration even more. Zhang and Cao (2018), using the extended resource-based view (Lavie, 2006), also conceived interorganisational systems as a resource to be leveraged and showed that their "appropriation" for communication, integration and intelligence directly influences SCC.

Partnership investments. Joint investments by partners to support collaboration are also shown to influence engagement. Srivastava et al. (2015) explained that these "idiosyncratic" investments

can be tangible, such as in joint manufacturing facilities, or intangible, such as in a highly efficient interorganisational process, and could have little value outside the collaboration. Over time, these investments create switching costs that place barriers in the way of ending collaborative relationships. In their study of the effect of relational resource antecedents on SCC and performance, Srivastava et al. (2015) found that partnership specific investments have a direct and significant influence on collaboration. Lindsey Hall et al. (2022) similarly found that partnership investments have a direct influence on collaboration in logistics.

Interplay of systems and processes and relationships. A number of studies have examined the interplay between systems and processes and relationships as antecedents of SCC. Some demonstrate that systems and processes are antecedents of relational factors while others find relationships to be antecedents of systems and processes. For example, J. V. Chen et al. (2014) found information sharing, and the quality and availability of that information, was an antecedent of trust. Similarly, Panahifar et al. (2018) found information security, accuracy and readiness were antecedents of trust. However, Hung et al. (2011) showed that commitment and trust were antecedents of both information sharing, and the quality of information shared. Likewise, Lee et al. (2010) found that relationship characteristics – being trust, commitment, interdependency, and length of relationship – precede strategic and operational information sharing. While both relationships and systems and processes are identified as antecedents of engagement in SCC, there is evidence in the literature that they also influence each other.

Consumer cocreation: The consumer cocreation literature demonstrates the important antecedent effect of systems and processes on motivation to collaborate. Prahalad and Ramaswamy (2004) proposed that cocreation between business and consumers is dependent on (1) dialogue, as the ability of businesses and consumers to have a two-way conversation, (2) access, as consumer access to information from businesses, (3) risk, as an assessment by consumers of the risks versus benefits of cocreation, and (4) transparency, as the information accessible to consumers is transparent. These four elements are collectively known as the DART model. Three of the four elements of the DART model (dialogue, access and transparency) relate to systems and processes. Mainardes et al. (2017) found that two of these elements (access and transparency) have a significant and positive influence on banking clients' cocreation behaviour. Anshu et al. (2022) tested the DART model's moderating effect on the relationship between the barriers to innovation cocreation (complexity, risk and justice) and consumer resistance to innovation cocreation in the retail industry. They found that all three systems and processes related elements of the DART model have moderating effects.

Consumer cocreation also depends on the tools businesses offer to support consumers and their ability to effectively interact with those tools. Füller and Bilgram (2017) argued that consumers cannot be expected to effectively cocreate in new product development unless the firm provides a sound understanding of the innovation being sought and the means to share their creative ideas. They found that "tool support" has a significant effect on an enjoyable cocreation experience for the consumer.

Conversely, consumers need the know-how and confidence to effectively interact with business systems. Self-efficacy reflects an individual's perception of their capacity to organise themselves and implement actions to achieve certain results (Bandura, 1978). Self-efficacy has been shown to influence consumer motivation to engage in cocreation with firms in various contexts. Alves and Mainardes (2017) tested how trust, perceived benefits, and the perception of self-efficacy influence consumer cocreation of value in service industries. They found self-efficacy was the most important influence. Im and Qu (2017) investigated influences on cocreation in the restaurant sector and found that customers with a higher level of knowledge, self-efficacy and motivation are more likely to participate in the cocreation experience.

2.3.4 Contextual influences

A smaller number of articles (15) consider the influence of context on motivation to engage in SCC. However, there is no consensus on their effects. The lack of consensus on contextual influences is not surprising given that context, by definition, only applies in particular circumstances. There is limited evidence of the moderating or mediating effects of context on the other elements of the framework. The findings are contradictory and generally taken from single studies. We treat them as outliers and have thus not included them in the updated framework as there is not adequate support for them.

Firm size and industry type. Differing evidence exists on the influence of firm size, measured by the number of employees, annual sales and industry type. Firm size is shown to be a significant influence on collaboration by Mora-Monge et al. (2019), but insignificant by Wu et al. (2014) and Wu and Chiu (2018). Mora-Monge et al. (2019) also showed industry type to be a significant influence on engagement in collaboration and that finding aligns with that of Wu et al. (2014) and Wu and Chiu (2018). Chengalur-Smith et al. (2012) tested the effects of firm size and industry type on the benefits of collaboration but found the results were insignificant.

Uncertainty. Guided by transaction cost economics, two studies tested the effects of uncertainty on engagement in collaboration. J. V. Chen et al. (2014) tested the effects of environmental uncertainty on information sharing. The study found no significant effect. Likewise, Srivastava et al. (2015) tested the moderating effect of market and technological turbulence on the relationships between resource complementarity and resource specificity and collaboration. Only one effect was found to be significant, that of technological turbulence on the relationship between resource complementarity and collaboration. Lee et al. (2010) similarly found that the rate of technological change positively and significantly affects information sharing and collaboration.

Product type. Myhr and Spekman (2005) tested the moderating effect of product type on the relationship between trust and electronically mediated exchange on collaboration. They found electronically mediated exchange more influential in collaboration on standardised products and trust more influential in collaboration on customised products. As only one study in the directly relevant group made this finding, we treat it as an outlier and do not include it in the antecedents of consumer motivation to collaborate in the SC.

Culture. Culture refers to the norms, beliefs and underlying values shared in an organisation or within a nation regarding appropriate business practices in the SC (Zhang & Cao, 2018). The effect of organisational culture on motivation to engage in SCC has been examined in a number of studies. Lee et al. (2010) tested the influence of cultural similarity on information sharing and collaboration. They found positive and significant effects in operational information sharing and operational and strategic collaboration. Zhang and Cao (2018) used a construct called "collaborative culture" made up of four dimensions: collectivism, long-term orientation, power symmetry, and uncertainty avoidance. They found that collaborative culture has a positive and significant effect on interorganisational systems appropriation and on SCC, but a non-significant moderating effect on the relationship between interorganisational systems appropriation and SCC. Acquah et al. (2021) tested the effect of each individual dimension of collaborative culture on SCC and found collectivism and power symmetry had significant and positive effects, while long term orientation and uncertainty avoidance were non-significant. In a case-based study, Lockström et al. (2010) investigated the influence of national culture on SCC in the automotive industry in China. They proposed that a high level of cultural distance between multinational actors inhibits SCC.

Consumer cocreation: Context is also an important influence on consumer cocreation. However, some of the contextual influences are different from those observed in SCC literature. Personal characteristics of the consumer are shown to be a significant influence on cocreation in a number

of ways. Chatterjee et al. (2023) tested the effect of demographic characteristics (age, gender and education) in a model measuring consumer behavioural intention to cocreate. The results showed that the effects of all three demographic variables are significant. Zare et al. (2018) tested the effect of personality type on cocreation involvement using four personality types associated with new product adoption. They found types all more likely to be willing to be involved in cocreation compared to other consumers were innovators, who are usually among the first to try new products (Rogers, 1983); market mavens, whose market knowledge influences others to adopt new products (Feick & Price, 1987); emergent nature consumers, who have the ability to envisage how new concepts can be introduced in the marketplace (Hoffman et al., 2010); and technology enthusiasts, who have high levels of optimism and interest in new technology (Zare et al., 2018).

The combined influence of individual personality, skills and circumstances on consumer behaviour can be measured using the motivation–opportunity–ability framework (MacInnis et al., 1991). Bettiga et al. (2017) used the motivation–opportunity–ability framework to test the influences on consumers' willingness to cocreate in virtual communities. They found that the motivation and ability of individuals had strong positive and significant effects, but opportunity did not.

Contextual factors in the external environment have also been shown to have significant influence on consumer cocreation. Some of these influences are similar to those identified in the SCC literature. For example, Zare et al. (2018) found industry and product type to be significant influences on consumer interest in cocreation. Their study found differences in levels of cocreation interest between the sports and music industries, and that deep knowledge of a product category further influences cocreation interest. Alimamy and Gnoth (2022) found that industry subcategory can also influence cocreation intention. Their study compared cocreation intention between online shoppers using a traditional web platform and those using an augmented reality (AR) enabled shopping platform. They found perceived personalisation (a value dimension) had a direct effect on cocreation intention for traditional online shoppers, but for AR enabled shoppers the effect was mediated by trust (a relational dimension) and risk. Prahalad and Ramaswamy (2004) explained that consumers trade off potential risks in cocreation against its potential benefits. Mainardes, Teixeira et al. (2017) explored the influence of risk in cocreation behaviour using the DART model. They found risk to be the strongest and most significant of the DART model influences on cocreation. In the banking industry, Grott et al. (2019) demonstrated the influence of national culture on cocreation. They found that the direct relationships between cocreation, brand loyalty, and word of mouth were more powerful for British consumers than for Spanish consumers.

2.3.5 Antecedents of consumer motivation to collaborate framework

The antecedents of consumer motivation to collaborate in the SC framework depicted in Figure 2.3 reflect the findings of the thematic analysis which includes the subcomponents of each antecedent influencing consumers' motivation to engage in SCC. Apart from the detailed subcomponents included in this framework, it differs from the initial theoretical framework (Figure 2.1) in two ways. First, the influence of perceived value and relationships on collaboration is bi-directional. This is supported by social exchange theory (Emerson, 1976; Thibault & Kelley, 1959) and the analysis of the SCC and consumer cocreation literature which showed that perceived value and relationships directly motivate collaboration, but they are in turn enhanced by that collaboration (e.g., S.E. Fawcett et al., 2012; Füller & Bilgram, 2017). Second, relationships and systems and processes are joined by a bidirectional arrow. This change is based on evidence from the SCC literature which showed that while both relationships and systems and processes influence collaboration directly they also influence each other (e.g., Hung et al., 2011; Panahifar et al., 2018).

The subcomponents section also reflects the interplay between some of the components of the framework. First, an arrow is used between trust and commitment and between brand trust and brand love to depict the hierarchical nature of those relationships. This is supported by theory (Morgan & Hunt, 1994; Schmid & Huber, 2019) as well as by the thematic analysis (e.g., Tsanos & Zografos, 2016; Wallace et al., 2021). Second, in the systems and processes section, two sets of subcomponents have been grouped together in a box representing their interdependence. This applies to information sharing, information quality and interorganisational systems in the SCC section and dialogue, access and transparency in the consumer cocreation section. The role of the subcomponents in these groups is to facilitate communication between SC actors and they work together to achieve this. Third, where direct equivalence exists between the antecedents of collaboration observed in the SCC and consumer cocreation they have been grouped together and enclosed in a colour coded box.

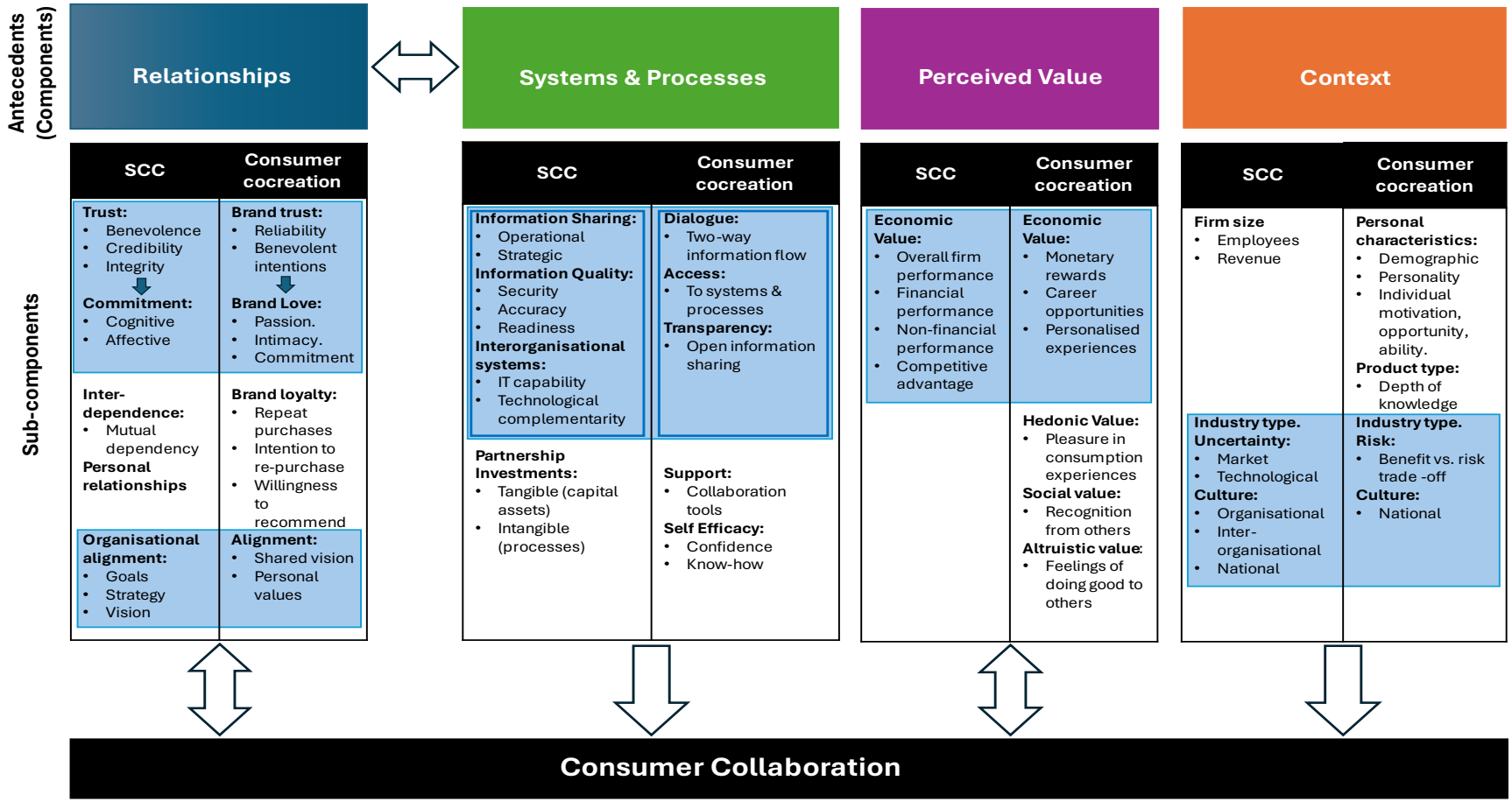

Figure 2.3: Antecedents of consumer motivation to collaborate in the supply chain framework

2.4 Research hypotheses

Our review of related literature identified four key antecedents of consumer motivation to collaborate in the supply chain: (1) *Perceived value* refers to consumers' expectation that the benefits of collaboration will outweigh the associated costs; (2) *Relationship strength* between consumers and businesses fosters consumers' willingness to share resources; (3) *Systems and processes* are fundamental to enabling collaboration, though their requirements differ for businesses and consumers; and (4) *Contextual factors,* such as the demographic profile of the actors, culture, risk and uncertainty and the products being exchanged, can influence the motivation of the actors. The following sections discuss each antecedent as it relates to our research hypotheses.

2.4.1 Perceived value

Social exchange theory explains that actors in a network are motivated to act by the expectation of rewards (Emerson, 1976; Thibault & Kelley, 1959). Social behaviour is the result of an exchange process whose purpose is to maximise benefits and minimise costs. Collaboration engagement can thus be motivated when superior value is offered by collaboration compared to traditional market mechanisms.

Our review of the B2B and selected B2C literature demonstrates the important antecedent effect of perceived value in motivating collaboration. This is demonstrated in a SCC context by factors such as improved financial performance and logistics performance. In the B2C literature, cocreation is shown to create value in various contexts by factors such as economic rewards and personalisation of experiences (e.g., Roberts et al., 2014; Zare et al., 2018). Given these studies and results, we posit that perceived value can act as an antecedent of consumer motivation to collaborate. Therefore, we hypothesise:

H1: *Perceived value is an antecedent of consumer motivation to collaborate with retailers in last mile logistics.*

However, the literature review also showed that there are some differences between the types of value that motivate consumers and those that motivate businesses. Both business and consumers derive economic value from collaboration, but other types of value not cited in the SCC literature have been shown to influence consumers' motivation to cocreate. For that reason, a measurement instrument that considers multiple dimensions of value should be considered. Furthermore, we observed that enhanced relationships can be an output of collaboration. This is depicted in Figure 2.3. This effect is not tested as the outputs of collaboration are out of scope of this study.

2.4.2 Relationships

Social exchange theory (Emerson, 1976; Thibault & Kelley, 1959) further explains that over time regular exchange of value between partners creates interdependent relationships which means that businesses become reliant on each other to achieve their business objectives. Relational factors like trust, commitment and reciprocity can thus be antecedents of the motivation to collaborate.

In the B2B literature "trust" is the most discussed relational influence on SCC. Fawcett et al. (2012) concluded that without a foundation of trust, collaborative alliances cannot be built or sustained. "Commitment" represents a higher level of relationship between actors than trust, but is also a logical progression from it. The hierarchical progression from trust to commitment is demonstrated in a number of studies (e.g., Ryu et al., 2009; Tsanos & Zografos, 2016). Commitment trust theory (Morgan & Hunt, 1994) explains that commitment represents partners' desire to invest in a relationship so that it may continue in the long term.

When consumers collaborate with businesses, they do so with inanimate brands. Consumers, however, have long been shown to assign personality traits to brands, seeing them as human characters or assuming the perspective of the brand to articulate their own views (Fournier, 1998). Two types of brand relationship discussed in the B2C literature mirror the influence of trust and commitment described in the SCC literature: brand trust and brand love.

Brand trust assumes both a cognitive assessment by the consumer of a brand's reliability to perform its functional tasks and an emotional assessment that the brand will act with the best of intentions toward the consumer (Delgado-Ballester, 2004). Brand love represents a higher level of brand relationship and has three dimensions: passion, intimacy and commitment. The hierarchical relationship between brand trust and brand love in the cocreation literature mirrors the relationship between trust and commitment in the SCC literature.

Based on our review of the literature, it is expected that the strength of a consumer's relationship with a retail brand is reflected by two similar but independent dimensions: brand trust and brand love. We hypothesise that these two variables each have a direct influence on their motivation to collaborate with retailers in last mile logistics. Therefore, we make the following hypothesis:

H2: *The strength of consumer relationships with retailers, demonstrated by the level of brand trust (**H2a**) and brand love (**H2b**), is an antecedent of consumer motivation to collaborate with retailers in last mile logistics.*

In the literature review we observed that enhanced relationships can be an output of collaboration. This is depicted in Figure 2.3. This effect is not tested as outputs of collaboration are out of scope of this study.

2.4.3 Systems and processes

Collaboration in the supply chain relies on the availability of effective systems and processes that facilitate information sharing and communication. **Systems** refer to the technologies, such as software and network connectivity platforms, that enable actors to connect and exchange information. **Processes** include the procedures and protocols that ensure the effective use of these technologies for collaboration. These processes define the responsibilities of actors, service standards, remediation protocols, and agreements regarding what information will be shared, how it will be shared, and how it will be used. Grean and Shaw (2002) explained that the initial collaboration between Walmart and Procter and Gamble relied not only on the connectedness of the two organisations but also on the implementation of shared scorecards to report results, dedicated teams to manage their collaborative program and an agreed process and format by which to transfer data.

In a B2C context, consumers use their smartphones as the only tool or technology to collaborate in the supply chain. Technology is no longer a barrier to collaboration for most consumers as over 80% of the population in many countries now have a smartphone (Laricchia, 2024). However, the key is the ability of consumers to use a smartphone for collaboration (i.e., the processes of using the technology from a consumer perspective). Businesses can provide the necessary levels of dialogue, access and transparency to consumers through their processes (see the DART model by Prahalad and Ramaswamy, 2004), yet actual collaboration is dependent on consumers having the knowledge and confidence to effectively interact with them. This is where consumers' self-efficacy plays a role.

Self-efficacy reflects an individual's perception of their capacity to organise themselves and implement actions to achieve certain results (Bandura, 1978, 1989). While the levels of dialogue, access and transparency provided by retailer processes may vary, it is expected that consumers with higher levels of self-efficacy are more likely to be more motivated to collaborate than those with lower levels of self-efficacy. Therefore, we hypothesise:

H3: *The perceived ability of consumers to successfully interact with retailer systems and processes, demonstrated by their self-efficacy, is an antecedent of consumer motivation to collaborate with retailers in last mile logistics.*

The literature review showed that there is an interplay between systems and processes and relationships. This is depicted in Figure 2.3. However, the evidence for this interplay is contradictory and therefore not appropriate to test in a generic framework.

2.4.4 Contextual factors

Context is shown to be an important antecedent influence on motivation to collaborate in our literature review, however we do not test its influence in this study. The contextual influences tested in the literature are diverse and sometimes contradictory. For example, in the B2B literature, firm size (measured by number of employees) was found to be a significant influence in some studies (Mora-Monge et al., 2019) but not significant in others. Likewise, industry type was shown to be a significant influence in some studies (e.g., Wu & Chiu, 2018; Wu et al., 2014) but not significant in others (Chengalur-Smith et al., 2012). In the B2C literature a diverse range of contextual influences have been investigated including demographic and personal characteristics of consumers, product and industry type, risk and national culture (Chatterjee et al., 2023; Grott et al., 2019; Mainardes et al., 2017; Zare et al., 2018). Testing all or some of these influences would not align with the purpose of this study which is to determine to what extent a generic framework of consumer SC collaboration explains collaboration in the B2C context of last mile logistics. Once a baseline has been established by this study, contextual influences may be explored further.

Chapter 3 : Methodology

3.1 Introduction

Chapter 1 introduced the background and context of this study, situating it within the domain of SCC, and specifically within the emerging context of consumer collaboration in last mile logistics. The motivations for this research are threefold: (1) to address a gap in the literature regarding the consumer's role as an active supply chain collaborator; (2) to explore the complex and costly logistical challenges faced by retailers due to the growth of e-commerce; and (3) to leverage the author's professional experience in the retail industry, where technology and collaboration have significantly reshaped operational practices. The overarching aim of the study is to explore the extent to which the existing knowledge and frameworks in the SCC literature, supplemented by insights from the consumer cocreation literature, can be deployed to explain the emerging motivation of consumers to collaborate with retailers in last mile logistics. This aim is supported by several objectives, including the identification of future research opportunities in this emerging field.

Chapter 2 presented a comprehensive review of both the SCC literature and selected consumer cocreation studies that address the antecedents of consumer motivation to collaborate within the supply chain. This review culminated in the identification of four key thematic antecedents: perceived value, relationship strength, systems and processes, and contextual factors. These were synthesised into a graphical framework that illustrates their relationships and conceptual linkages. Based on this framework, three hypotheses were developed for empirical testing.

This chapter describes and justifies the research methodology adopted in this study. First, we identify the range of methodological approaches employed in relevant literature across SCC, consumer cocreation, and related fields. This review informs the rationale for selecting the survey research design as the most appropriate method for addressing the study's objectives as a means of data collection. We then outline the justification for selecting structural equation modelling (SEM) as the primary analytic technique, with a specific focus on the partial least squares structural equation modelling (PLS-SEM) approach adopted for this research.

3.2 Methodologies applied in the literature

Rose et al. (2024 ch.4) suggested four decisions need to be made before considering an appropriate methodology for a research project. These decisions relate to the research problem being investigated and the hypotheses being tested. The research problem being investigated by this study is to develop and test a framework for the antecedents of consumer motivation to collaborate with retailer supply chains. Our three hypotheses are:

H1: *Perceived value is an antecedent of consumer motivation to collaborate with retailers in last mile logistics.*

H2: *The strength of consumer relationships with retailers, demonstrated by the level of brand trust (H2a) and brand love (H2b), is an antecedent of consumer motivation to collaborate with retailers in last mile logistics.*

H3: *The perceived ability of consumers to successfully interact with retailer systems and processes, demonstrated by their self-efficacy, is an antecedent of consumer motivation to collaborate with retailers in last mile logistics.*

Rose et al. (2024 ch.4) explained that the first decision is whether the research problem and hypotheses require a deductive or inductive approach. A deductive approach involves testing theory against observed data while an inductive approach builds theory based on observations. Our research requires a deductive approach because it involves the testing of a theoretical framework built from the SCC and consumer cocreation literature. The selected method therefore needs to be capable of collecting observational data to test the framework.

The second decision is whether the hypotheses are descriptive or explanatory in nature. In this case, the hypotheses are designed to explain the motivation of consumers to collaborate with retailers in last mile logistics. This means we need to select a methodology that can imply causality.

The third decision is whether the research questions require the collection of data through multiple periods of time or through a cross sectional "snapshot." The research questions are designed to gain an understanding of a contemporary phenomenon which has not been investigated extensively and for which variations over time are not included in the research questions. This means a longitudinal cross sectional approach to data collection is required.

The fourth decision is whether the research questions require new (primary) data to be collected or whether existing (secondary) data can be used. As far as we are aware, there is no pool of data on consumer behaviour relating to last mile logistics collaboration with retailers which means our selected method needs to capture primary data.

Answering the four questions suggested by Rose et al. (2024 ch.4) narrows our search to methodologies that allow a deductive approach with observational data, can imply causality, take a "cross sectional" approach and can accommodate primary data. The following sections discuss four methodologies that potentially meet these criteria: experiment, survey, case study and mixed methods.

3.2.1 Experimental method

In the experimental method, one or more independent variables are treated or manipulated to test their effects on a dependent variable.(Rose et al., 2024 ch. 7). The effects are isolated by comparing results from a randomly selected treatment group with those of a control group that does not receive the treatment. The three main types of experiment are laboratory, field and "quasi-experiment." The inherent advantage of the experimental method is that it allows researchers to eliminate rival explanations for causality and is thus high in internal validity. For this reason, experimental method is considered the "gold standard" for causal based research projects (Bryman & Bell, 2015 Ch. 3).

There are many examples in the health literature of experiments being used to investigate consumer attitudes similar to those investigated in this study. For example, Frewer et al. (2003) investigated the direct and mediating role of trust in communication media in forming consumer attitudes towards the perceived benefits and risks of genetically modified foods. To answer the research questions an attitude change experiment was conducted involving 1,405 consumers from four European countries. Half the participants were regular beer consumers, while the other half were regular yoghurt consumers. All participants were recruited in major malls during shopping hours and quota sampled on the basis of their age, gender and socio-economic class. After prior attitudes to genetic modification in food production had been assessed, participants received different information materials (either product-specific information or balanced/general information about genetic modification in food production) and were asked to evaluate different types of genetically modified foods (either beer or yoghurt). The information materials were attributed to different information sources (either an industry association, a consumer organisation, or a government source). Results showed that the information provision had little effect on people's attitudes toward genetically modified foods, and that perceptions of information source characteristics contributed very little to attitude change.

While internal validity is a major strength of experimental method it can be potentially threatened by various interaction effects that arise from the nature of experiments. For example, Rose et al.

(2024 ch. 6) explained that "experimenter-expectancy" effects can bias results when researchers behave differently towards treatment and control groups. Similarly, "subject-expectancy" effects can bias results when participants become overly enthusiastic about being part of the experiment. The latter phenomenon is known as the "Hawthorne effect" was first observed in a study at the Hawthorne factory of the Western Electric company in the US. Workers at the factory were found to become more productive when they realised they were being observed regardless of the changes in working conditions that were being tested by the study (Roethlisberger et al., 1939 cited by Bryman & Bell 2015 ch3). The external validity of experiments can also be questioned based on the often-unrepresentative nature of the subjects in the treatment and control groups.

The study conducted by Roethlisberger et al. (1939) was a field experiment. Field experiments take place in a real world setting but they are rare in the business literature due to the difficulty of randomly assigning groups and manipulating independent variables. The laboratory experiment offers researchers control over the random allocation of subjects and manipulation of independent variables. Laboratory experiments are used commonly in the business literature and an example from our review is discussed below. The "quasi-experiment" is a hybrid form that is conducted in a natural setting but does not purport to fully control the allocation of subjects between groups or manipulation of variables. Hofstede's (1984) famous study of cultural differences is cited by Bryman and Bell (2015 ch.3) as an example of a quasi-experiment. The study took place in IBM subsidiaries across 67 countries. This setting allowed some degree of control in that all subjects were employees of the same multinational company. The culture of IBM became the dependent variable, and the national cultures of IBM's employees became independent variables. Hofstede fulfilled some of the requirements of internal validity for experiments conducted outside of the laboratory by conducting his research twice, first in 1967–8 then again in 1971–3.

In the reviewed literature, Kennedy et al. (2022) used a laboratory experiment to determine the influence of gender on motivation to cocreate. In their study, cocreation with a brand (Nike) was the dependent variable and gender (male and female) were independent variables. Three separate experiments tested motivators of cocreation (hedonic value, social importance, and personal values) using the Nike brand as the cocreation subject. All the experiments were conducted with randomly assembled treatment and control groups. The study found significant differences between females and males in their motivation to cocreate. Females were likely to cocreate when they found the activity to be hedonic, while males were more likely to cocreate when they found the activity to be socially important. Both genders were found to be likely to cocreate when the activity aligned with their personal values. The research sample for the study was drawn from

university students in the US who were compensated for their participation with class credits. The authors recognised the unrepresentative nature of the sample and selecting only one brand (Nike) for treatment were limitations to the generalisability of the results.

3.2.2 Surveys

The word survey is used to describe a research method as well as a way of collecting data. This section discusses the attributes of survey as a research method. The survey method involves asking individuals questions, either directly or remotely, via questionnaires to gather personal, company or sector information (Adams, Khan et al., 2007 Ch. 7). The survey method is typically used when data can be collected from more than one case, the data is quantitative or quantifiable and the objective of the study is to find patterns of association in the data (Bryman & Bell, 2015 ch. 3). By studying a sample of a population researchers hope to generalise or draw inferences about a general population. The survey method is most associated with quantitative studies and is used extensively in many disciplines. Survey is the dominant method used in the reviewed literature, being used by 81% of the articles in our sample.

Survey method has a number of inherent strengths and weaknesses. One of its strengths is that it can be a quick and a relatively easy way to collect large amounts of data. Even quite small amounts of data can then be used to test hypotheses and create statistical inference about larger populations (Rose et al., 2024 ch. 6). Some of the articles in the review provide evidence of the speed available to researchers using the survey method. For example, X. Wang et al. (2023) used panel data to investigate consumer intention to cocreate logistics services collecting 500 valid responses over 4 weeks. The speed offered by the survey method makes it an appropriate choice when the research objective involves a contemporary phenomenon that can be observed in the market.

The survey method is also flexible in the type and range of variables that can be measured. Akman et al. (2018) investigated consumer motivation to cocreate value in innovation communities and collect information on 15 variables from five related but different categories: social factors (4 variables), individual factors (3 variables), value cocreation activities (4 variables), value (4 variables) and learning (1 variable). Likewise, Lee et al. (2010) investigated the antecedents and performance effects of SCC using 15 variables from six categories: relationship characteristics (4 variables), organisational characteristics (3 variables), IT characteristics (2 variables), information sharing (2 variables), collaboration (2 variables) and performance (2 variables). The flexibility in the type and range of variables that can be measured makes the survey method suitable for

exploratory research where the effects of phenomena are yet to be fully understood, pertinent to the work of this thesis.

Unlike experimental methods, the survey method does not require manipulation of independent variables (which often cannot be manipulated in the real world) or the identification of control groups (which often cannot be controlled) (Bryman & Bell, 2015 ch.3). However, this can lead to potential problems with internal validity and to questions about the direction of causality (Bryman & Bell, 2015 ch.3 ; Creswell, 2014). For example, in the reviewed literature a number of articles considered the effect that systems and processes and relationships have on each other but made different conclusions on the direction of causality. Some articles demonstrated that systems and processes are antecedents of relationships (e.g., J. V. Chen et al., 2014; Panahifar et al., 2018) while others found relationships to be antecedents of systems and processes(e.g., Hung et al., 2011; Lee et al., 2010).

Researchers attempt to mitigate internal validity and direction of causality concerns by having strong literature backing before designing a survey and by using a variety of internal validity tests once the data is collected. This often results in a proposed theoretical framework developed in one article subsequently being tested in another. For example, Tsanos et al. (2014) built a conceptual framework of the behavioural antecedents of collaboration, integration and supply chain performance from the literature and proposed established scales by which the variables can be measured. The framework was subsequently tested using survey data in (Tsanos & Zografos, 2016) and validity tests performed. Convergent validity measures the extent to which a measure correlates positively with alternative measures of the same construct and is calculated using average variance extracted (AVE) scores. Discriminant validity measures the extent to which a variable is distinct from others in the dataset and is calculated using the Fornell Larcker criteria or the heterotrait–monotrait ratio (Hair et al., 2021 ch. 4).

Another inherent weakness of the survey method is that, like all response-based methods, it relies on self-reporting by respondents and, by implication, their accuracy and honesty (Rose et al., 2024 ch. 6). These problems can be exacerbated in panel-based studies where respondents are paid and therefore have a vested interest in providing answers to survey questions even if they have not had the experience the survey is investigating. Preisendorfer and Wolter (2014) explained that respondents to a survey will generally answer accurately and honestly if they perceive that the net utility of giving a truthful answer is higher than that of an edited or false one. They explained that four factors can influence accuracy and honesty: (1) survey affinity (familiarity and comfort with

surveys), (2) social approval and trait desirability (desire to present themselves in a favourable light), (3) survey design (the mode, topics and data collection method) and (4) sociodemographic profile of the respondents. Researchers can mitigate potential problems with accuracy and honesty at the design stage by making questions easy to understand and complete, by inserting qualifying questions, making responses anonymous and collecting data from a representative sample of the research population (Rose et al., 2024 ch. 9 and 10).

The survey method is also vulnerable to non-response bias which is the risk that non-respondents to a survey had valuable insights which were not captured. This can affect the external validity or generalisability of findings. Armstrong and Overton (1977) suggested that late respondents to a survey are more characteristic of non-respondents than early respondents and that researchers can therefore test for the effects of non-response bias by comparing the responses of early respondents with later respondents. The Armstrong and Overton (1977) approach has been commonly applied in the reviewed literature. For example, Salam (2017) tested for non-response bias by splitting their research sample into three groups on the basis of early and late survey return times. They then applied t-tests to the major constructs and key demographic variables of the first and third groups to assess the statistical significance of differences between the groups. No statistically significant differences were found, suggesting that non-response bias did not affect that study.

3.2.3 Case studies

The case study method is distinguished by a focus on a "bounded situation," in that it tends to involve an intensive examination of a particular setting (Bryman & Bell, 2015 ch.3). It is a flexible form that can be used to describe a single interesting instance, an instance that seems to have a wider purpose or multiple instances of similar cases to uncover meaningful patterns (Berg, 2009). Case studies are generally associated with qualitative data, although quantitative data sources can be incorporated in case study design. The case study method was the second most frequently used (13%) in the reviewed literature.

One of the advantages of the case study method is its flexibility for theory development and testing. Case studies can be used for inductively building theory, deductively to test theory, and abductively to both build and test theory (Dubois & Gadde, 2002). The method also has the advantage of being able to investigate causal complexity within a case where there are many relevant factors relating to the phenomena under investigation (Rose et al., 2024). This allows triangulation of findings (Yin, 2014). Another advantage is that the case method is suited to studying real life situations (Yin, 2014). As a result, case studies tend to be more accessible to practitioners than

studies using other methods. According to Yip (2011), practitioners are inherently more interested in pattern recognition than in predictions of what might happen on average. In the case method managers can see how the circumstances presented compare with their own situation and how they might produce successful outcomes for their company.

A limitation of using the case method is that the generalisability (external validity) of the findings is considered limited. Cases are not sampling units as we would expect to see in the survey method, so statistical generalisation is not generally possible (Yin, 2014). Instead, the case method allows generalisability at the theoretical level (Bryman & Bell, 2015 ch.3). Case method is used more often when the research questions relate to "how and why" rather than "what" (Yin, 2014).

The case method is often used in the business literature to explore real world phenomena that have not yet been fully explored in the literature such as consumer collaboration in the SC being addressed in this study. For example, Rogerson and Parry (2020) explored the impact of blockchain technology on improving supply chain visibility in food supply chains. Data was gathered through 28 semi-structured interviews with 15 firms from suppliers and users of blockchain as well as commentators on the technology. An inductive approach was taken to data analysis. The study found that SC visibility facilitated by blockchain affects the role of agency in the SC by blurring organisational boundaries and potentially shifting the role of agent to the solution provider. For practitioners, blockchain enhances SC visibility but relies on full digitisation which may restrict applications to low value, high margin goods. Rogerson and Parry (2020) suggested that their findings can be generalised in terms of the "issues to be overcome" but generalisability is limited by the case method deployed.

The seven reviewed studies that use case study methodology were mostly inductive in their approach. Their purpose was to build a framework or model of collaboration adoption but not to quantitatively test it. One of the strengths of case methodology is the depth of insight it can deliver. Consequently, some of the frameworks created via case studies are much richer than those tested via survey methodology. For example, Aloni et al. (2015) identified 16 antecedents of SCC grouped into three macro classes: cross-organisational cooperation, rules, and procedures - accessibility, and super-ordinate goals. Fawcett et al. (2012) developed a complex framework of the 'enablers' and 'resistors' of SCC that contains 10 separate categories of influences. Sheu et al. (2006) collected data on eight relationship variables to develop a supplier–retailer relationship model which included five research propositions.

One of the reviewed case studies used a deductive approach. Chae et al. (2005) developed a theoretical model of IT effects on SCC from the literature then tested it using five retailer–supplier cases. They found that the supplier–retailer relationship (trust, interdependence, long-term orientation, and information sharing) moderated the efficacy of IT in SCC.

3.2.4 Mixed methods

The mixed methods approach combines two or more qualitative and quantitative methods to answer the research questions. The main advantage of the mixed methods approach is that it can combine the advantages of quantitative and qualitative methods and mitigate the disadvantages of using only one or the other. Creswell (2014 Ch. 1) explained that mixed methods research can take various forms. Convergent parallel design involves collecting quantitative and qualitative data, usually at about the same time, then integrating them when interpreting the results. This approach can be used where a comprehensive analysis of a complex problem is required. For instance, Tomasi et al. (2018) explored the communication process in paediatric critical care using observation, survey, interviews and departmental metrics. Convergent parallel design allows the identification of incongruent findings between the methods which can be resolved or investigated.

Explanatory sequential design involves collecting quantitative data, interpreting the results then building further understanding of the research problem by conducting qualitative research. This approach can be used when patterns of association observed in quantitative research are inadequate to explain why the effects are happening. In the reviewed literature, explanatory sequential design was used by Fawcett et al. (2008) to investigate the benefits, barriers and bridges to SCC adoption. This research problem is similar to the one being investigated by this study although it is conducted in a B2B context. The survey method was used first to gain a quantitative view of the issues then 51 semi-structured case interviews were conducted to uncover what the authors called the "whys" behind the quantitative survey findings. Fawcett et al. (2008) concluded that while technology issues are a major barrier to successful SCC adoption, relational issues have a greater influence.

Exploratory sequential design involves collecting qualitative data first, interpreting the results then attempting to make those insights more generalisable through a quantitative phase. This approach can be used when the research problem, as in this study, has not previously been the subject of extensive investigation. In the financial services literature Sivaramakrishnan et al. (2017) investigated the influence of attitudinal factors and financial literacy on stock market participation. In the qualitative phase, in-depth interviews were conducted which, in conjunction with a literature

review, identified seven variables influencing stock market participation. A framework based on the theory of planned behaviour was then tested using survey method and analysed using structural equation modelling. The results indicated that financial literacy influences investment intention, which in turn predicts actual investment behaviour.

Complex or embedded design involves embedding qualitative and quantitative approaches into the same piece of research so that, for example, an experiment may be augmented by interviews with the participants. This approach can be used when the research problem can be defined in advance and requires a depth of insight that neither quantitative nor qualitative methods alone can provide. In the education literature Bastable et al. (2023) investigated the acceptability of a new program to improve racial equity in school disciplinary practice. Quantitative research was conducted with 118 educators and in-depth interviews with four teachers who had already deployed the techniques in their classrooms. The quantitative component of the research validated the program while the qualitative findings were used to improve its utility.

There have been arguments against the use of mixed methods research. Bryman and Bell (2015 Ch.27) explained that arguments against using a mixed methods approach (the "embedded methods argument" and the "paradigm argument") rely on the idea that quantitative and qualitative methods have inherent epistemological and ontological positions. They argued that this cannot be supported in the business literature where methods are put to a wide variety of tasks. Mixed methods studies are associated with the "pragmatic approach" (Creswell, 2009). The pragmatic approach to research has a focus on understanding the problem, a pluralistic attitude to theory and methods and achieving practical outcomes. The current study takes a pragmatic approach to the problem of consumer motivation to collaborate on retail supply chains and so it aligns philosophically with the mixed methods approach.

Table 3.8: Synthesis sample and selected B2C cocreation studies methods

Authors	B2B/ B2C	Industry Sector	Method	Sample size	Participants	Country
Aloini et al. (2015)	B2B	Manufacturing (Yacht)	Case	1	Focal company and suppliers	USA
Chae et al. (2005)	B2B	Retail	Case	5	Retail–supplier pairs	Taiwan
de Leeuw and Fransoo (2009)	B2B	Wholesale/Retail	Case	3	Purchasing, sales, supply chain managers	Netherlands, Germany, Denmark,
S.E. Fawcett et al. (2012)	B2B	Multiple industries	Case	50	Supply chain managers	USA
Sheu et al. (2006)	B2B	Retail	Case	5	Senior managers from retailer–supplier pairs	Taiwan
Zander et al. (2016)	B2B	Wood industry	Case	5	Senior managers	Germany
Lockström et al. (2010)	B2B	Manufacturing, (Automobile)	Case	30	Purchasing, quality + sourcing managers	China
Acquah et al. (2021)	B2B	Petroleum sector	Survey	166	Downstream petroleum sector managers	Ghana
Afshan et al. (2018)	B2B	Manufacturing	Survey	166	Supply chain managers, VPs, CEOs	India
Chatha et al. (2023)	B2B	Manufacturing	Survey	307	Supply chain professionals	International
J. V. Chen et al. (2014)	B2B	Automotive parts	Survey	233	Managers	Taiwan
Y.-H. Chen et al. (2014)	B2B	Multiple industries	Survey	226	Supply chain managers	Taiwan
Chengalur-Smith et al. (2012)	B2B	Multiple industries	Survey	89	GEOPS software users	USA
Chong et al. (2013)	B2B	Small to medium enterprises (SME)	Survey	136	Head of IT or Logistics	Malaysia
Pimentel Claro et al. (2006)	B2B	Flowers	Survey	67	Wholesale and retail buyers	Netherlands
Gligor and Holcomb (2014)	B2B	Supply chain managers	Survey	151	Managers	USA
Hung et al. (2011)	B2B	Multiple industries	Survey	122	Senior operations managers	Taiwan
Lee et al. (2010)	B2B	Manufacturing	Survey	251	Supply chain managers	South Korea
Lindsey Hall et al. (2022)	B2B	Retail /Manufacturing	Survey	264	Supply chain professionals	USA
Lobo et al. (2013)	B2B	Agriculture	Survey	520	Vegetable farmers	China
Mora-Monge et al. (2019)	B2B	Multiple industries	Survey	175	Supply chain executives	USA
Myhr and Spekman (2005)	B2B	Manufacturing	Survey	150	Supply chain managers	Finland, Norway, Sweden.

Authors	B2B/ B2C	Industry Sector	Method	Sample size	Participants	Country
Narasimhan and Nair (2005)	B2B	Multiple industries	Survey	411	Supply chain professionals	USA
Nyaga et al. (2010)	B2B	Multiple industries	Survey	370/290	Buyer and seller supply chain managers (2 samples)	USA
Panahifar et al. (2018)	B2B	Multiple industries	Survey	189	Managers	Thailand
Richey et al. (2012)	B2B	Retailing	Survey	170	Technology and supplier relationship managers	USA
Ryu et al. (2009)	B2B	Multiple industries	Survey	141	Supply chain buyers and sellers	South Korea
Salam (2017)	B2B	FMCG (Food and Beverage)	Survey	181	Logistics/ Supply chain managers	Thailand
Sanders and Premus (2005)	B2B	Manufacturing	Survey	251	Executive managers	USA
Srivastava et al. (2015)	B2B	Manufacturing	Survey	115	Supply chain executives	USA
Tsanos and Zografos (2016)	B2B	Manufacturing	Survey	162	Logistics/ Supply chain managers	International
Vlachos et al. (2008)	B2B	Retail/Manufacturing (Food)	Survey	71	Logistics/Marketing managers	Greece
W.-T. Wang et al. (2023)	B2B	Multiple industries	Survey	366	Supply chain managers	Taiwan
Wu and Chiu (2018)	B2B	Manufacturing + Service	Survey	206	Senior managers	Taiwan
Wu and Chuang (2010)	B2B	Manufacturing + Service	Survey	184	Senior managers	Taiwan
Wu et al. (2014)	B2B	Manufacturing + Service	Survey	177	Senior managers	Taiwan
Zhang and Cao (2018)	B2B	Multiple industries	Survey	211	Supply chain professionals	USA
Fawcett et al. (2008)	B2B	Multiple industries	Mixed	254/51	Supply chain managers	USA
Kennedy et al. (2022)	B2C	Social media (Nike)	Experiment	188-120	Students	USA
Roberts et al. (2014)	B2C	Online gaming	Interviews	17	Online gamers	UK
Akman et al. (2018)	B2C	Innovation communities	Survey	309	Innovation community members	USA
Alimamy and Gnoth (2022)	B2C	Retail	Survey	375/408	Online shoppers	USA
Alves and Maindares (2017)	B2C	Multiple industries	Survey	372	Service consumers (students)	Portugal
Bettiga et al. (2017)	B2C	Food	Survey	180	Consumers	International
Chatterjee et al. (2023)	B2C	Multiple industries	Survey	351	Consumers	Not known
Füller and Bilgram (2017)	B2C	Innovation communities	Survey	727	Virtual new product development community	Germany

Authors	B2B/ B2C	Industry Sector	Method	Sample size	Participants	Country
Grott et al. (2019)	B2C	Banking	Survey	224	Banking customers	UK/Spain
Hussain et al. (2021)	B2C	Restaurant	Survey	421	Restaurant diners	Shanghai, China
Im and Qu (2017)	B2C	Restaurant	Survey	501	Restaurant diners	USA
Kamboj et al. (2018)	B2C	Brand communities	Survey	407	Social media users (students)	India
Mainardes et al. (2017)	B2C	Banking	Survey	265	Banking customers	Brazil
Wallace et al. (2021)	B2C	Social media	Survey	332	Social media brand followers	Portugal
X. Wang et al. (2023)	B2C	Last mile logistics	Survey	500	Omnichannel shoppers	Singapore
Zare et al. (2018)	B2C	Multiple industries	Survey	509	Consumers	Italy

3.2.5 Methodology selection for this study

The selected method for this study is the survey method because it accommodates a deductive approach with observational data, can imply causality, take a "cross sectional" approach and can accommodate primary data (Rose et al., 2024). Furthermore, it best suits the nature and content of the phenomenon to be studied compared to the other methods considered.

The objective of the study is to develop and test a generic framework of SCC motivation in the consumer domain of last mile logistics. To ensure the framework is generic it needs to be representative of a broad range of industry sectors, geographical contexts, and research approaches. It is therefore appropriate that the framework should be built using a systematic literature review (Chapter 2) rather than in a specific bounded context such as case method or other qualitative inductive methods such as interviews. This also excludes an exploratory mixed methods approach.

The framework then needs to be tested to find patterns of association that can be generalised. This means a quantitative not qualitative approach should be adopted. To find patterns of association it is necessary to gather data from individuals on their attitudes toward collaboration. The types of collaborative behaviour being investigated (click and collect, pick up from retailer parcel locker and home delivery via a retailer location aware delivery app) can be observed in the real world. The survey method has the advantage of being able to collect data from multiple individuals in a real world setting without the internal validity challenges associated with field experiments or the external validity challenges associated with laboratory experiments. The survey method is therefore a more appropriate choice for this study than experimental methods. Survey is also more appropriate than a deductive form of case method which has the disadvantage of being limited in its generalisability.

An explanatory sequential mixed methods approach has been used to answer similar research questions relating to motivations for collaborative behaviour (e.g., Fawcett et al., 2008), but in this case the survey method is preferred because our purpose is to understand to what extent a generic framework of SC collaboration developed from the literature can explain consumer motivation to collaborate in retailer supply chains.. Finally, the survey method has the advantage of speed of execution which is relevant given the time constraints of a PhD program of study in Australia.

3.3 Analytic methods applied in survey-based literature

The analytic method adopted for this survey is structural equation modelling (SEM) specifically the partial least squares (PLS-SEM) version of the method. To explain this choice, we discuss the various analytic methods used in studies that use survey method in the reviewed literature and explain their applicability to this study. Table 3.2 shows the analytic methods used in each of the studies in the reviewed literature that use the survey method. The table includes the total number of variables and the number of endogenous variables (variables that are measured by other variables) to give an indication of model complexity. As can be seen, SEM is used in 82% (36) of these studies and regression in 14% (6). A mixed analytical method and a neural network modelling approach are each used in a single study.

3.3.1 Structural equation modelling (SEM)

SEM is a multivariate technique that involves the simultaneous analysis of the relationship between multiple variables (Biricik Gulseren & Kelloway, 2020). It differs from other multivariate techniques such as multiple regression analysis by allowing researchers to simultaneously model relationships between multiple dependent and independent variables. SEM is strongly associated with the survey method (Hair et al., 2021 ch. 1) and this association is borne out in our review (Table 3.2). Hair et al. (2021) explained that there are two types of SEM: covariance-based SEM (CB-SEM) and partial least squares SEM (PLS-SEM).

Covariance-based SEM (CB-SEM) is used in 48% (21) of the articles that use the survey method in the reviewed literature (Table 3.2). CB-SEM is a covariance-based approach to SEM that considers latent variables as common factors that explain the covariance between their associated indicators. These common factors serve as proxies for the unobservable concepts (such as trust, satisfaction and value) that they measure. This means CB-SEM is philosophically associated with reflective measurement, although in practical terms it is capable of measuring reflective and formative constructs (Hair et al., 2021 ch. 1). In reflectively measured constructs causality flows from the latent variable to its indicators (indicators reflect the latent variable) whereas in formatively measured constructs causality flows from the indicators to the latent variable (indicators form the latent variable) (Coltman et al., 2008). Reflective measurement is chosen when the indicators of the construct are likely to be correlated. For example, Alimamy and Gnoth (2022), in their model of intention to cocreate, used a reflective construct to measure "perceived value". The three indicators that reflect perceived value all relate to exceeding

Table 3.9: Analytic methods used in reviewed survey-based studies

Authors	Analytical Method	Type	Variables measured	Endogenous Variables
Afshan et al. (2018)	SEM	CB-SEM	6	2
Alimamy and Gnoth (2022)	SEM	CB-SEM	5	3
Chatha et al. (2023)	SEM	CB-SEM	5	2
Chen et al. (2014)	SEM	CB-SEM	8	5
Y.-H. Chen et al. (2014)	SEM	CB-SEM	6	3
Füller and Bilgram (2017)	SEM	CB-SEM	14	9
Gligor and Holcomb (2014)	SEM	CB-SEM	6	3
Hussain et al. (2021)	SEM	CB-SEM	9	5
Im and Qu (2017)	SEM	CB-SEM	6	3
Kamboj et al. (2018)	SEM	CB-SEM	4	2
Lee et al. (2010)	SEM	CB-SEM	15	3
Lindsey Hall et al. (2022)	SEM	CB-SEM	5	2
Lobo et al. (2013)	SEM	CB-SEM	5	4
Mora-Monge et al. (2019)	SEM	CB-SEM	4	2
Narasimhan and Nair (2005)	SEM	CB-SEM	5	2
Nyaga et al. (2010)	SEM	CB-SEM	8	5
Salam (2017)	SEM	CB-SEM	4	1
Sanders and Premus (2005)	SEM	CB-SEM	4	3
Wallace et al. (2021)	SEM	CB-SEM	10	3
X. Wang et al. (2023)	SEM	CB-SEM	6	2
Zhang and Cao (2018)	SEM	CB-SEM	4	2
Grott et al. (2019)	SEM	PLS SEM	5	3
Akman et al. (2018)	SEM	PLS-SEM	15	8
Alves and Maindares (2017)	SEM	PLS-SEM	5	1
Bettiga et al. (2017)	SEM	PLS-SEM	6	2
Chatterjee et al. (2023)	SEM	PLS-SEM	12	4
Chengalur-Smith et al. (2012)	SEM	PLS-SEM	6	1
Hung et al. (2011)	SEM	PLS-SEM	8	6
Panahifar et al. (2018)	SEM	PLS-SEM	6	3
Ryu et al. (2009)	SEM	PLS-SEM	8	4
Srivastava et al. (2015)	SEM	PLS-SEM	6	2
Tsanos and Zografos (2016)	SEM	PLS-SEM	12	11
W.-T. Wang et al. (2023)	SEM	PLS-SEM	8	7
Wu and Chiu (2018)	SEM	PLS-SEM	14	3
Wu and Chuang (2010)	SEM	PLS-SEM	7	5
Wu et al. (2014)	SEM	PLS-SEM	9	3
Zare et al. (2018)	Regression	Binary Logistics regression	7	1
Richey et al. (2012)	Regression	Hierarchical regression	5	2
Vlachos et al. (2008)	Regression	Hierarchical regression	8	3
Mainardes et al. (2017)	Regression	Multiple linear regression	5	1
Pimentel Claro et al. (2006)	Regression	Ordinary Least Squares regression (OLS)	4	1
Myhr and Spekman (2005)	Regression	Ordinary Least Squares regression (OLS)	4	1
Chong et al. (2013)	Modelling	Neural network	9	1
Acquah et al. (2021)	Mixed	PLS-SEM, Fuzzy sets qualitative comparative analysis (fsQCA)	7	1

expectations and would therefore expect to be correlated. In contrast, Sarstedt et al. (2023) in their corporate reputation model used a formative construct to measure "performance". The six indicators measure related but discrete consumer perceptions such as how well the company is managed, its economic stability and the risk involved in doing business with them. Removing one formative indicator has the effect of changing the meaning of the latent variable but removing a single reflective indicator should have no such effect.

CB-SEM is a confirmatory technique, which means that researchers need to specify a theoretical model then collect data to estimate how well the model estimates the covariance matrix for a given dataset. For example, Chatha et al. (2023) used the technology, organisation framework (Tornatzky, 1990) to test whether a firm's internal context (technological and organisational) influences the relationship between the external environment, the enablement of supply chain integration and operational results. They found that a firm's organisational and technological context has a significant role in enabling supply chain integration which in turn influences operational performance. The effect of environmental context was shown to be significant on technological context but not insignificant on organisational context.

While CB-SEM is a popular choice for confirmatory studies it has a number of limitations. One of these limitations is its ability to predict latent variable scores. Waller (2023) explained that in any common factor model with known (or estimated) model parameters, infinite sets of factor scores can be constructed to fit the model. This means that factor scores are "indeterminate" which in turn means that the correlations between factors in the model are also indeterminate. CB-SEM is therefore unsuitable for use in studies concerned with making predictions. Another limitation of CB-SEM is that it requires multivariate normality in the data it uses for analysis. This restricts the types of data that can be analysed.

Partial least squares structural equation modelling (PLS-SEM) is used in 34% (15) of the articles that use the survey method in the reviewed literature (Table 3.2). In contrast to CB-SEM, PLS-SEM is a composite based approach which involves combining indicators to form composite variables which, as with CB-SEM, serve as proxies for the unobservable concepts (such as trust, satisfaction and value) that they measure. This means PLS-SEM is philosophically associated with formative measurement although, like CB-SEM, in practical terms it is equally capable of measuring reflective and formative constructs (Hair et al., 2021 ch. 1). Formative measurement and reflective measurement often coexist in the same PLS-SEM framework. For example, Carlson et al. (2019) investigated consumer value in brand page experience (VIBE) in social media. In their

framework, the VIBE endogenous variable was measured formatively by six dimensions of value each of which was measured reflectively.

Unlike CB-SEM, PLS-SEM is a causal predictive technique that focuses on explaining the variance in the model's dependent variables. It does this by applying ordinary least squares regression (OLS) to estimate path coefficients with the aim of maximising the amount of explained variance (R^2) in the endogenous variables (Hair et al., 2021 ch. 1). PLS-SEM always produces a composite score for each measured construct and is therefore most suitable for models that are attempting to predict the effect of variables on an endogenous construct. This feature of PLS-SEM can be used to predict multiple causal effects between endogenous variables. For example, W.-T. Wang et al. (2023) investigated the effect of trust and commitment on collaboration. They used institution-based trust and four types of commitment as formative indicators of "c-commerce behaviour." However, they also used institution-based trust to predict each of the four types of commitment. In fact, the model, which had a total of eight variables, contained seven endogenous variables measured by R^2 scores.

PLS-SEM is less restrictive than CB-SEM regarding its data requirements. It does not require multivariate normality, making it more robust to non-normal data distributions. It can accept smaller sample sizes, single indicator variables and data with outliers more robustly than CB-SEM (Hair et al., 2021 ch. 1). Hair et al. (2017) have demonstrated that PLS-SEM has superior statistical power compared to CB-SEM when the sample size is small, and the model is complex.

3.3.2 Regression

Regression analysis is used in 14% (6) of the studies in the reviewed literature that use the survey method. Regression analysis is a statistical method which analyses the relationship between two or more variables so that one of the variables can be explained or predicted by the other variables (Mohr et al., 2022). It is primarily used as a confirmatory rather an exploratory method (Hair et al., 2021 ch. 1). All of the regression-based studies in the reviewed literature used multivariate techniques to predict the dependent variable although the type of regression used varied.

OLS regression is a type of linear regression used in three studies in the reviewed literature. Linear regression assumes a linear relationship between the variables. In a study of bank customers' intention to cocreate with banks Mainardes et al. (2017) used OLS to test Prahalad and Ramaswamy's (2004) DART framework. The DART framework consists of four independent variables (dialogue, access, risk and transparency) with cocreation as the independent variable. A

significant and positive association between access, risk assessment and transparency and cocreation was established but dialogue was found to have an insignificant relationship with cocreation.

Hierarchical regression is a type of OLS regression in which predictor variables can be added or removed from the model in steps to determine which have the most statistical power (Beer & Wellman, 2021). Hierarchical regression is used in two of the studies in the reviewed literature. Richey et al. (2012) investigated the effects of three independent variables (technological innovativeness, technological complementarity, and flexibility) on collaboration in reverse logistics and in turn the effect of collaboration on time-based logistics service quality. Hierarchical regression is used to test incremental changes in R^2 as interaction (moderation) effects are applied to the model. Only one of these moderating effects was found to be significant, technological complementarity's moderating influence on the relationship between technological innovativeness and collaboration.

Binary logistics regression was used in one of the studies in the reviewed literature. Logistics regression differs from linear types of regression in that it predicts the probability of a categorical (non-linear) outcome (Das, 2023). Binary logistic regression is used when the categorical outcome being predicted is binary (e.g., yes or no). Zare et al. (2018) used binary logistic regression to analyse the impact of personal characteristics and of product-related drivers on consumer interest to cocreate. They found both to be significant.

Regression analysis has some limitations for this study. First, regression is generally used to measure only direct relationships between independent variables and a dependent variable (e.g.,Mainardes et al., 2017). More complex relationships between variables can be considered but these involve stepwise addition and removal of variables as in hierarchical regression (e.g., Richey et al., 2012). However, Sarstedt et al. (2020) have shown that when variables are estimated sequentially, as in hierarchical regression, rather than simultaneously, as in SEM, it can have serious consequences for measurement quality. Second, regression can only consider abstract constructs such as trust and self-efficacy, after standalone validation via a technique such as confirmatory factor analysis (Hair et al., 2021 ch. 1). This makes regression a sub-optimal choice when the research question involves considering the relationship between multiple latent variables. Third, regression analysis, unlike SEM, does not account for measurement error. Nunkoo and Ramkissoon (2012) explained that SEM treats both the dependent and independent variables as random variables with error of measurement taking this into account in evaluating the model.

Regression analysis on the other hand usually assumes perfect measurement which is not often possible in research involving theoretical concepts such as motivation (Hair et al., 2021 ch. 1).

3.3.3 Other analytic methods

Two other analytic methods can be observed in the reviewed literature that use the survey method. A neural network was used by Chong et al. (2013) in their study of the influence of relational factors and systems and processes on the adoption of collaborative commerce. A neural network is a computational model designed to resemble the human brain. It is able to acquire knowledge and learn from it and therefore represents a form of artificial intelligence (Haykin, 2007 cited by Chong 2013). A neural network consists of interconnected processing units (nodes) that operate in parallel, with each connection having adjustable weights that are modified through the learning process (Shahroodi et al., 2024). The use of neural networks in social science research is increasing based on its strengths in finding patterns of association and ability to make predictions. However, a limitation of the method for this study is its inability to perform hypothesis testing (Yan et al., 2024).

A mixed analytical method approach was used by Acquah et al. (2021) in their study of SCC adoption in the petroleum sector. The two methods used were PLS-SEM and fuzzy sets qualitative comparative analysis (fsQCA). Acquah et al. (2021) explained that their choice of two methods was based on a desire to offer a symmetrical and asymmetrical analysis of the data. They used PLS-SEM results to demonstrate "general tendencies" towards collaboration in the data, and fsQCA to demonstrate the existence of "multiple realities" in achieving successful SCC. According to Hu et al. (2024) fsQCA differs from PLS-SEM because it considers multiple combinations of cause and effect rather than solely independent influences. This can lead to, for example, the identification of an exogenous variable that influences only a small subset of cases. Our study considers to what extent a model derived from the SCC and cocreation literature can be deployed in a consumer context. The extra perspective available from a second method such as fsQCA may be valuable in future research once this research question is answered.

3.3.4 Chosen analytic method

The selected analytic method for this study is PLS-SEM. SEM was preferred over regression methods for three reasons. First, regression analysis measures the direct effect of independent variables on a dependent variable but is not suited to measuring the relationship between the independent variables (Sarstedt et al., 2020). Second, SEM has a superior ability to measure latent

constructs, such as perceived value, brand trust, brand love and self-efficacy, used in this study (Hair et al., 2021 ch. 1). Regression is capable of measuring latent constructs but the stepwise construction of a model can lead to measurement error (Sarstedt et al., 2020). Third, SEM algorithms, unlike regression algorithms, account for measurement error (Nunkoo & Ramkissoon, 2012).

A number of studies have compared the performance of PLS-SEM and CB-SEM revealing shared attributes and important differences between the two SEM variants. Astrachan et al. (2014) investigated the effect of expectations on the perceived level of expertise and trustworthiness of family-owned companies using an SEM and generated results from both CB-SEM and PLS-SEM. The purpose of the study (apart from comparing analytic methods) was to develop theory, not to test it, meaning the study was therefore exploratory in nature. The results showed that item loadings were generally higher in PLS-SEM resulting in 17 of 25 indicators being retained in the PLS-SEM model compared to only 10 of 25 in the CB-SEM model. The smaller number of retained indicators in CB-SEM was due to the stringent fit requirements of CB-SEM which require validation using confirmatory factor analysis before the model can be tested. A consequence of the reduction in indicators is that the "expertise" latent variable was left with only one indicator compared to the generally recommended CB-SEM minimum of three (Hair Jr et al., 2010). In addition, PLS-SEM was shown to be a better predictor of significance between variables than CB-SEM. One relationship in the model (between business expectations and trust) was found to be insignificant in CB-SEM but significant in PLS-SEM. Both analytic methods produced strong R^2 results with the CB-SEM scores being slightly higher than those for PLS-SEM. Astrachan et al. (2014) attributed this discrepancy to the non-normality of the data used in the analysis, however this also reflects CB-SEM's already discussed inherent weakness in making predictions because of "factor indeterminacy" (Waller, 2023). It should be noted that the non-normality of the data could also have influenced the results for path significance discussed above. Astrachan et al. (2014) concluded that PLS-SEM is the preferred analytic method at the theory development stage and when there is a low likelihood of normal data, while CB-SEM is more appropriate for later stage theory testing.

Dash and Paul (2021) also compared the performance of CB-SEM and PLS-SEM. Their study investigated the influence of brand identity, brand image and customer satisfaction on purchase intention. These well-known concepts were used to build a simple SEM which was tested using data collected using previously validated scales. However, the SEM, like the SEM used by Astrachan et al. (2014), was not used to confirm a specific existing theory but instead was

exploratory in nature. The results confirmed some of the findings from Astrachan et al. (2014) but extended the insights in other areas. Item loadings were again higher in PLS-SEM than in CB-SEM but Dash and Paul (2021) also observed the range of scores was narrower meaning that PLS-SEM provided more consistent reliability and validity at the item level. The authors noted that no indicators were dropped from the analysis due to pretesting of the data. At the construct level, while both methods achieved satisfactory convergent validity as measured by average variance extracted and internal consistency reliability as measured by Cronbach's alpha, they were consistently higher for PLS-SEM enhancing its advantage in testing reliability and validity. All relationships between constructs in the model were found to be significant and Dash and Paul (2021) derived no evidence for choosing one method over the other on the basis of path analysis. However, these results were influenced by the nature of the data used for analysis which was pretested and therefore normal in its distribution. Dash and Paul (2021) also compared the results of simple mediation and moderation effects in the model finding PLS-SEM and CB-SEM to be equivalent. However, they noted that moderation effects are more complicated to measure in CB-SEM than in PLS-SEM.

Both CB-SEM and PLS-SEM have attributes that make them a suitable choice for this study. Reasons to favour the choice of CB-SEM are that the initial framework to be tested consists entirely of reflective constructs which is philosophically the domain of CB-SEM. The framework itself is relatively parsimonious with only three independent variables and one endogenous variable meaning it does not have the complexity that would make PLS-SEM a more obvious choice. Furthermore, the sample size (374) is comparable with many similar studies that use CB-SEM (Table 3.1), and it is unlikely that the small sample size advantage of PLS-SEM is relevant to this study. Despite these advantages, PLS-SEM was chosen over CB-SEM because of some important advantages it has for the type of study being undertaken. PLS-SEM is primarily a causal predictive technique whereas CB-SEM is primarily a confirmatory technique (Hair et al., 2021 ch. 1). Our study aims to predict the causes of consumer collaboration in last mile logistics using a framework that has not previously been tested. Dash and Paul (2021) advise that, "If the research objective is theory testing and confirmation, then the appropriate method is CB-SEM. In contrast, if the research objective is prediction and theory development, then the appropriate method is PLS-SEM."

Another important advantage of PLS-SEM is that it is less restrictive than CB-SEM in its data requirements. It does not require multivariate normality, can accept smaller sample sizes, single indicator variables and data with outliers more effectively than CB-SEM (Hair et al., 2021 ch. 1).

This is an advantage for our study where data is being collected from the real world and may contain anomalies. It also allows us flexibility to test variations of the initial framework using smaller subsets and extra variables based on the results we derive from our initial analysis.

Artificial intelligence based analytical methods such as neural networks were not selected because of their inability to test hypotheses (Yan et al., 2024). Adding an additional analytical technique such as fsQCA to PLS-SEM has been shown to offer deeper insights than using PLS-SEM alone (Acquah et al., 2021), however this approach may be more valuable in future research when the results of this study have been fully explored.

Chapter 4 : Empirical Survey Instrument and Data Collection

4.1 Introduction

Chapter 3 explained the rationale for selecting the survey methodology and partial least squares structural equation modelling (PLS-SEM) as the analytic approach for this study. These choices were primarily guided by the research questions and hypotheses, consistent with recommendations in the literature (e.g., Rose et al., 2024 Ch.7).

The research problem, introduced in Chapters 1 and 2, seeks to understand consumer motivations for collaborating in last mile logistics. Specifically, the three hypotheses investigate the antecedent effects of perceived value, consumer–brand relationships, and consumers' perceived ability to navigate retailer systems and processes, conceptualised as self-efficacy. To examine this, a generic framework is proposed grounded in insights from the supply chain collaboration (SCC) and consumer cocreation literatures.

Chapter 3 identified that the research problem and hypotheses require a method suited to a deductive and explanatory research design and capable of collecting cross sectional primary data. Four methodological approaches were considered: experiment, survey, case study and mixed methods. These were evaluated with reference to relevant examples from both the reviewed literature and other research domains. While each method has merits and limitations, the survey method was ultimately selected for its effectiveness in capturing real world data, contemporary phenomena, its generalisability and its efficiency.

For data analysis, PLS-SEM was chosen after reviewing analytic techniques used in prior survey-based studies. Both regression analysis and structural equation modelling (SEM) were identified as suitable; however, SEM was preferred due to its capacity to model latent constructs and account for measurement error. Between the two primary SEM techniques, PLS-SEM was selected over covariance-based SEM (CB-SEM) because of its predictive capabilities and more flexible data requirements (Hair et al., 2021 ch. 1).

This chapter discusses the design and testing of the survey instrument, the rationale for sampling, and the administration of the survey. First, we outline the design of the survey instrument, adopting the "tailored design method" proposed by Dillman et al. (2014), which emphasises aligning instrument design with the research context. Given the explanatory and cross sectional nature of the study, the survey instrument was developed accordingly. The selected items used to test the hypotheses are justified with reference to the literature, with the inclusion of additional behavioural and demographic items to provide contextual insights. The section concludes with a discussion of the pretesting procedure and subsequent adjustments.

The second section details the sampling strategy and survey administration. This includes the rationale for using a non-probabilistic purposive sampling approach and an online panel for respondent recruitment and data collection. The pilot phase, in which 46 consumers completed the survey, is then discussed, followed by a description of the data collection timeline and the procedures used to screen and remove low-quality responses.

4.2 Survey design

This section focuses on the design of the survey instrument that was used to collect the data for this study. Dillman et al. (2014 ch. 1) explain that the wide range of possible applications of survey instruments makes it impractical to apply the same design approach for every situation. They instead propose a customised approach called "tailored design" in which survey design is adapted to the context of the research. Dillman et al. (2014) explain that tailored design can be applied in the development of all aspects of a survey to reduce total survey error (coverage, sampling, nonresponse, and measurement) and motivate all members of the sample population to respond honestly and accurately within resource and time constraints. The tailored design approach was used to develop the survey instrument.

4.2.1 Design principles

Cross sectional design: Surveys can be designed to collect data in a cross sectional or longitudinal manner. In cross sectional design data is gathered from a population at a specific moment in time. Once the data is collected researchers can analyse the relationship between independent and dependent variables immediately. This makes cross sectional design useful if the research objective is gaining an understanding of a contemporary phenomenon (Wang & Cheng, 2020). Almost all the studies that used survey method in the reviewed literature were cross sectional in design, as shown in Chapter 3. For instance, Akman et al. (2018) used cross sectional design to investigate

the phenomenon of cocreation in online innovation communities. They found that cocreation is facilitated by providing feedback, helping, rapport building and information sharing and that facilitation effects are mediated by learning. In contrast, longitudinal survey design involves the collection of data from a population at multiple points in time which makes it useful in understanding long term issues or changes in attitudes under time-based influences. One study in the reviewed literature used a longitudinal survey design. Fawcett et al. (2010) investigated the resisting forces to SCC in two exploratory surveys conducted over a six-year period finding that resisting forces accumulate over time if not addressed by a clear strategy focused on customer satisfaction. Cross sectional design was chosen for this study as the research objective is to gain understanding of a contemporary phenomenon which has not yet been extensively investigated and where no benchmark studies exist.

Explanatory design: Hinz (2016) explained that surveys can have different purposes and that each requires a different design approach. Exploratory surveys help researchers gain an initial understanding of an issue and therefore do not require theoretical validation or representative samples. Descriptive surveys seek to understand the state of a social reality at a point in time and likewise do not require theoretical validation but usually require a sample representative of a target market. Explanatory surveys seek to understand the causes of a phenomenon or a situation and are therefore the most demanding in terms of theoretical validation and sampling methodology.

In this study, the type of survey is explanatory because our main research objective is to explain consumer motivation to collaborate with retailers in last mile logistics. However, it also contains elements that are characteristic of exploratory and descriptive surveys. In the development and pilot phases (see Sections 4.2.3 and 4.3.4) our survey questions were tested with samples gathered either by convenience or with non-statistically valid subsets of the main dataset which is characteristic of exploratory surveys. The data gathered by the survey includes demographic profiling of the respondents and their attitudes towards online shopping in general which are used to provide context to the investigation but are not related to the hypotheses. This is characteristic of descriptive surveys. However, our main research objective remains to explain the causes of consumer motivation to collaborate so the design must satisfy the requirements of an explanatory survey.

The rigorous requirements of explanatory survey design relate to the need to find causal links between independent and dependent variables that can be generalised. The survey method was chosen for this study over other causal methods like experiment and deductive case study primarily

because of its inherently superior external validity, as shown in Chapter 3. This allows us to more easily generalise the results. However, one of the inherent weaknesses of the survey method, which it shares with other forms of observational research, is inferior internal validity compared to experimental methods. This means that explanatory survey design needs to consider how accurately the questions asked measure the intended behaviour, and the relationship between cause and effect. Explanatory survey design also needs to consider minimising respondent bias both by encouraging accurate and honest responses and ensuring the sample is somewhat representative. The rationale applied to selecting and testing questions for the survey is explained in the following sections.

4.2.2 Justification of the questions

This section justifies the selection of questions for the survey. This includes the questions used to measure the variables in the research framework developed in Chapter 2 and other questions included in the survey that are not related to hypothesis testing. We also discuss the rationale for the ordering of the questions. The full survey with the questions is in Appendix B.

The scales used to measure the variables in the research framework are in Table 4.10. They were all selected from articles published in reputable journals and from studies on consumer behaviour. Advice from experienced supply chain professionals and academic researchers regarding the usability of each scale was used to refine the scales where necessary. Five-point Likert scales were used to measure responses on each of the attitudinal indicators, where 1 is "strongly disagree" and 5 is "strongly agree". Figure 4.4 links the related items from Table 4.10 to each element of the research framework.

Collaboration frequency: The dependent variable in the research framework is collaboration frequency. Collaboration frequency was used as a proxy for motivation to collaborate, the assumption being those with greater motivation to collaborate will do so more frequently. In the survey, respondents were asked to nominate how often they use either click and collect, pick up from a locker in a retail store or home delivery using a retailer location aware tracking app on a 5-point ordinal scale ranging from "less than once a year" (1) to "at least once a week" (5) (Appendix A1 question 2).

Perceived value: From the many instruments that are available to measure consumer value, the Holbrook typology of value (Holbrook, 2006) was selected. The Holbrook typology was chosen because of its relative simplicity (4 dimensions) and its ability to encapsulate three of the most

common conceptualisations of consumer value in the literature (Gallarza et al., 2019) . These are (1) the "trade off" approach, in which the customer balances benefits and costs (Zeithaml, 1988) ; (2) the "dynamic approach", which considers value dimensions in different moments such as before or after purchase or in consumption (Woodruff, 1997); and (3) the "experiential" perspective, which captures the hedonic, symbolic and aesthetic aspects of consumption (Babin et al., 1994; Sweeney & Soutar, 2001).

By combining elements of the Holbrook typology further conceptions of value can be considered. According to self determination theory (Deci & Ryan, 2000) intrinsic value is experienced when an activity is enjoyed for its own sake. This can be measured by combining hedonic and altruistic value. Extrinsic value is experienced when an activity leads to external reward or recognition. This can be measured by combining economic and social value. In addition Holbrook (1999; 2006) proposed another composite pair of value indicators. "Self orientated" value is experienced when an activity leads to benefits to the individual and can be measured by combining economic and social value. "Other orientated" value is experienced when an activity causes benefits to be experienced to or from others and can be measured by combining social and altruistic value.

Leroi-Werelds (2019) has suggested updates to the Holbrook typology which measure even more types of value. We believe that testing the four value dimensions offered by Holbrook are sufficient for this study to examine the differences between consumers and businesses in their motivation to collaborate.

Holbrook's definition of **economic value** encompasses efficiency and excellence. Value is recognised when "a product or consumption experience serves as a means to a consumer's own objectives — as when prizing efficiency (e.g., miles per gallon of gasoline) or excellence (e.g., the quality of a loudspeaker's frequency response)" (Holbrook, 2006 p. 715-716). The benefits derived from collaboration in last mile logistics derive from efficiency rather than excellence and can be seen as a solution to the problems experienced by consumers when using home delivery to receive their online orders. A recent international survey of 3,000 consumers found that consumer problems with home delivery include high shipping costs (62%), damaged packages (51%) and lost packages (41%), and almost 78% are highly unlikely or not very likely to buy again from a retailer following a negative delivery experience (Shipengine, 2024). In addition, Paluzzi et al. (2025) have found that consumer impatience with delivery speed and delivery timeliness has a negative impact on customer satisfaction. Collaborating in last mile logistics offers consumers the opportunity for lower shipping costs, reduced risk of damage and loss, and the opportunity to choose the time of

a delivery or pick up with certainty. The selected scale to measure economic value was adapted from Gallarza et al. (2019) . The scale measures economic efficiency in the hospitality sector using the Holbrook typology. The scale was adjusted to reflect the last mile logistics context, with items related to problem solving, utility and delivery certainty.

Consumers achieve **hedonic value** from collaboration when the act of participation and the performance of the tasks involved yield experiences that provide psychological benefits independent of the service itself (e.g., Etgar, 2008; Fernandes & Remelhe, 2016; Mochon et al., 2012). The positive motivational effect of hedonic value has been demonstrated in several studies in different business contexts (e.g., Ahn & Thomas, 2020; Djelassi & Decoopman, 2016; Roberts et al., 2014). Consumers may experience hedonic benefits from collaboration in last mile logistics if the process itself is fun and enjoyable. The hedonic value scale was taken from Frey et al. (2011) The scale measures the motivation of individuals collaborating in online open innovation projects that derives from intrinsic enjoyment. No changes were made to the original scale.

The desire to be recognised by others has been shown to be an important motivator of consumer collaboration in various contexts (e.g., Fernandes & Remelhe, 2016; Mochon et al., 2012; Roberts et al., 2014). Collaboration in last mile logistics may generate **social value** for consumers if it generates recognition from others of their skill as an online shopper. The social value scale was taken from a study by Sweeney and Soutar (2001) that develops measures of consumer consumption values in the retail industry. The four items in the scale, which relate to different aspects of social value, have been modified slightly because Sweeney and Soutar (2001) measure the intent to consume whereas we measure the actual behaviour.

Consumers derive **altruistic value** from collaboration when their participation results in feelings of doing good for its own sake. Altruistic value has been shown to be a motivator of consumer collaboration in the cocreation literature in various contexts (e.g., Bettiga, Lamberti, & Noci, 2017; Roberts et al., 2014). Consumers may derive altruistic value through collaboration in last mile logistics if, for example, they believe their actions result in positive environmental impacts through reducing truck movements associated with home delivery or reducing the amount of packaging associated with an online order. The altruistic value scale is taken from a study by Sánchez-Fernández et al. (2009) that develops and tests measures of consumer value in a service context. The items in the scale measure ethical and moral behaviour and reference both environmental improvement and sustainability consistent with the altruistic value that may derive from

collaboration in last mile logistics (Belvedere et al., 2024). The second item has been modified to account for the last mile logistics context of this study.

Relationships: Brand trust and brand love were selected as proxies for consumer relationships with retail brands and included in the research framework in Chapter 2. **Brand trust** assumes both a cognitive assessment by consumers of a brand's reliability to perform its functional tasks and an emotional assessment that the brand will act with the best of intentions toward the consumer (Delgado-Ballester, 2004). The scale to measure brand trust is taken from a study by Sichtmann (2007) who developed a framework of antecedents and consequences of brand trust in the mobile phone market in Germany. The items of this scale measure both the cognitive and emotional dimensions of brand trust.

The inclusion of **brand love** as a separate measure in the survey allows us to test whether stronger brand relationships influence stronger motivation to collaborate in the same way that commitment represents a higher level of commitment than trust in the SCC literature (Morgan & Hunt, 1994). The scale selected to measure brand love is taken from Kumar et al. (2021) who examined the enablers of brand love toward natural products. Like many other studies of brand love, the scale is derived from the 10-item scale of Carroll and Ahuvia (2006) who pioneered the measurement of the concept. The scale proposed by Kumar et al. (2021) was selected because it captures the passion, intimacy and commitment dimensions of brand love which can be easily differentiated from brand trust.

To ensure that the consumer–brand relationship was linked to consumers' use of collaborative last mile logistics services, the name of the retail brand that the respondent most recently used to receive an order (via click and collect, retailer parcel locker, or location aware delivery app) was captured and used in the text of each brand related question (Table 4.10).

Systems and processes: The perceived **self-efficacy** of consumers to navigate retailers' systems and processes was selected as an antecedent influence on motivation to collaborate and included in the research framework in Chapter 2. The scale to measure the influence of perceived self-efficacy is taken from a study by Sun et al. (2020) who examined the antecedents of omnichannel service use using a digital restaurant platform as its context. The scale was selected because the items are competence-based, prospective and action-related, reflecting the important dimensions of the self-efficacy construct as discussed in Chapter 2. The word "omnichannel" was removed from the original questions to improve clarity.

Behavioural and demographic questions: In addition to the above measures, extra questions were included to gain information about respondents' general online shopping behaviour and their demographic profile. The general shopping behaviour questions were intended to provide information to help interpret the results of the hypothesis testing and to identify potential further areas for investigation. Included were questions to determine respondents' online shopping frequency, their use of collaborative methods for receiving a delivery, problems experienced with home delivery, reasons for choosing collaborative methods of delivery, and the value of the transaction. Respondents were allowed to elaborate on their experiences with text-based responses where appropriate. Demographic information was sought on respondents' age, gender, income, education level and domicile location. This information is not relevant to the hypotheses being tested, however these items are examined to determine if any patterns can be observed and to provide avenues for further research.

Order of questions: Following the recommendations of Dillman et al. (2014 ch. 7) the questions were presented in groups to create a narrative that encourages recall and accurate and full completion. The first group consisted of general questions about the respondents' online shopping behaviour including the frequency of their retailer collaboration in last mile logistics and the name of the specific retailer they last collaborated with. The second group of questions related to their most recent choice of collaborative method (click and collect, retailer parcel locker or location aware delivery app) including the 25 measurement scale questions presented in Table 4.10. The final group of questions sought demographic information including the postcode of the respondent. These potentially sensitive questions were placed at the end of the survey based on the recommendation of Dillman et al. (2014 ch. 7). The order in which the questions were asked is in Appendix B.

Table 4.10: Measurement scales and items used

	Question adopted	Original question	Source
Value scales (H1)			
Economic	E1: It solves the problems associated with normal home delivery. E2: It is more useful to me than regular home delivery. E3: It satisfies my need for delivery certainty.	The offering is problem-solving. The offering features utility. The offering satisfies a substantive need.	Gallarza (2019)
Hedonic	H1: It is fun. H2: It is interesting. H3: It is enjoyable.	It is fun. It is interesting. It is enjoyable.	Frey et al. (2011)
Social	S1: It helps me to feel acceptable. S2: It improves the way I am perceived. S3: It makes a good impression on other people. S4: It gives me social approval.	It would help me to feel acceptable. It would improve the way I am perceived. It would make a good impression on other people. It would give its owner social approval.	Sweeney and Soutar (2001)
Altruistic	A1: It has an ethical and moral interest for me. A2: The environmental improvement compared to regular home delivery is coherent with my ethical and moral values. A3: I am attracted by the inherent sustainability. A4: It has ethical and moral value for me.	It has an ethical and moral interest for me. The environmental improvement is coherent with my ethical and moral values. I am attracted by the inherent sustainability. It has ethical and moral value for me.	Sánchez-Fernández, Iniesta-Bonillo and Holbrook (2009)
Relationship scales (H2)			
Brand Trust	BT1: [Brand] feels responsible. BT2: [Brand] is reliable. BT3: [Brand] is trustworthy. BT4: [Brand] is dependable.	[Brand] feels responsible. [Brand] is reliable. [Brand] is trustworthy. [Brand] is dependable.	Sichtmann (2007)
Brand Love	BL1: [Brand] is totally awesome. BL2: I love [Brand]. BL3: I am passionate about [Brand]. BL4: I am very attached to [Brand].	[Brand] is totally awesome. I love [Brand]. I am passionate about [Brand]. I am very attached to [Brand].	Kumar, Dhir, Talwar, Chakraborty and Kaur (2021)
Systems and processes scale (H3)			
Self-Efficacy	SE1: I feel comfortable using the service on my own. SE2: I can easily operate the service on my own. SE3: I feel comfortable using the service even if there is no one around me to tell me how to use it.	I feel comfortable using the omnichannel service on my own. I can easily operate the omnichannel service on my own. I feel comfortable using the omnichannel service even if there is no one around me to tell me how to use it.	Sun, Yang, Shen and Wang (2020)

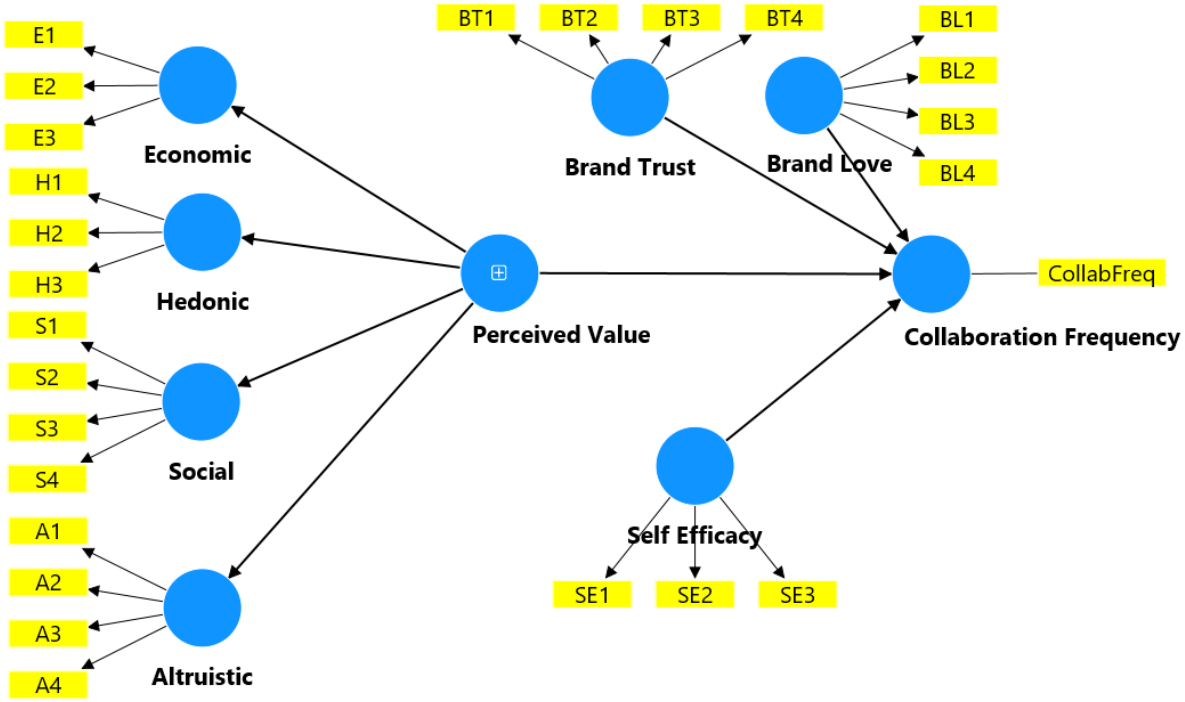

Figure 4.2: Measurement items for each element of the framework

4.2.3 Pretesting of the survey

According to Ruel et al. (2016), pretesting of surveys has several benefits including reducing measurement error, reducing the burden on respondents, checking whether questions are being interpreted correctly and ensuring that the order of questions is not influencing the way a respondent answers. The survey was pretested informally with 22 respondents known to the researchers. Each respondent seemed to understand the questions and found the survey easy to complete. Rose et al. (2024 ch.9) explained that making questions easy to understand and surveys easy to complete contributes to obtaining honest and accurate answers from respondents. Some changes were suggested by the respondents to the instructions accompanying the survey to provide further clarity for respondents and these changes were made. No other changes were made to the survey as a result of the pretesting.

4.3 Sample and survey administration

This section explains the methods used to calculate sample size, select respondents for the survey, how they were recruited, the rationale for selecting the delivery mode, outcomes from the pilot phase and how we derived the final dataset for analysis.

4.3.1 Sample size

Various methods have been suggested to check the adequacy of a sample size for PLS-SEM. Having an adequate sample size is important to ensure that the resultant model is robust and the results capble of generalisation.

The "10 times rule", first proposed by Thompson et al. (1995), suggests that a sample size should be 10 times the number of independent variables in the most complex path in the model. Applying the "10 times rule" to this study would result in a minimum sample size of 40. Hair et al. (2021 ch. 1) caution that the 10 times rule should only be considered as a rough guide because it does not consider statistical power of the model. Power tables (Cohen, 1992) such as G*Power (Faul et al., 2009) are available for this purpose. Like the 10 times rule, G*Power uses the most most complex path in the model to calculate a sample size based on an estimated effect size, target error size, statistical power (minimum 80% suggested) and number of predictors. Applying the G*Power algorithm to this study with an estimated effect size (f^2) of 0.15, a target error of 0.05, statistical power target of 80% and four indicators, a minimum sample size of 43 is calculated.

Kock and Hadaya (2018) contend that both the "10 times rule" and power analyses such as G*Power risk underestimating sample size by only considering one path in the model and propose the "inverse square root method" as an alternative. The inverse square root method calculates minimum sample size (n) by using a power level of 80%, the lowest significant path coefficient in the model, and the required significance level. A review of previous studies suggests a minimum significant path coeffecient size of 0.15 would be a reasonable expectation therefore at a significance level of 5% the minimum sample size is:

$$Significance\ level = 5\%,: n_{min} = \left(\frac{2.486}{0.15}\right)^2 = 274.67\ (275)$$

The inverse square root method is a much more conservative sample estimation method than either the 10 times rule or power tables. For this reason, Hair et al. (2021 ch. 1) suggest using the upper not lower bound of coefficient size expectations in the formula. Importantly, the sample collected for analysis for this study meets all the minimum sample size requirements we have discussed.

As a precursor to the analysis the raw data collected from the Qualtrics platform in text (strongly disagree to strongly agree, yes/no) was converted to numeric scales in SPSS so that it could be analysed in Excel, SPSS20 and in the structural model stage using SmartPLS4.

4.3.2 Respondent selection

Probability sampling and non-probability sampling are the two groups of sampling methodology available to survey researchers. Probability samples are designed so that each member of a population has an equal chance of being selected and are therefore preferred when the research objective is to draw inferences about the behaviour of the population from which the sample is derived (Rose et al., 2024 ch.9). Non-probability samples involve non-random selection of respondents. Non-probability sampling is used when the characteristics of a population are not known or when the research objective is exploratory (Vehovar et al., 2016). A non-probability sampling method was selected for this study as the characteristics of the population of consumer collaborators in last mile logistics are not yet known.

A number of techniques are available to researchers using non-probability sampling and their selection depends on the research objectives of the study. The main non-probability sampling methods used in the reviewed literature are purposive and convenience. Purposive sampling is a method that involves selecting respondents based on specific criteria decided by the researchers. It is used in studies that aim to gain the maximum understanding of a particular phenomenon (Vehovar et al., 2016). For example, in their study of contrasting perspectives toward SCC between buying and selling companies, Nyaga et al. (2010) recruited two groups of respondents from a database of manufacturing and service industry executives. One group consisted of executives of buying companies involved in collaborative relationships with selling companies while the other group consisted of executives of selling companies involved in collaborative relationships with buying companies. Nyaga et al. (2010) concluded that buying companies focus more on relationship outcomes from SCC while supplying companies look to safeguard their transaction specific investments through information sharing and joint relationship effort. Convenience sampling is a non-probability sampling method whereby respondents are selected based on their availability to researchers. Convenience sampling is associated with exploratory and pilot studies (Vehovar et al., 2016). For example, in their study of consumer intention to adopt smart parcel lockers in Thailand, Tsai and Tiwasing (2021) recruited respondents through social media and college alumni connections. They derived a ranked list of the most important attributes of a smart locker network for consumers should such a network be launched in Thailand.

A purposive sampling approach was adopted for this study because the research objective is to provide an understanding of the motivations of a specific type of online shopper that chooses to collaborate with retailers in last mile logistics. We sought respondents who had placed an order online and used click and collect, a retailer parcel locker, or a location aware delivery app to facilitate the acquisition of the goods. To ensure that respondents had a good recollection of the experience of that collaboration we sought respondents who had used one of the nominated collaborative methods in the last 60 days. A qualifying question was inserted in the survey to identify these respondents (Appendix B Q.25). We also applied loose quotas to assist with the generalisability of the findings. Respondents were sought from each state and territory of Australia in proportion to their population with a requirement that gender mix should be roughly equal. In addition, we determined that a minimum of 65 respondents would be recruited for each collaborative method (click and collect, retailer parcel locker, location aware delivery app) ensuring that data collection was not unduly skewed towards one collaborative method. We sought respondents over 18 years of age to ensure our sample consisted of adults.

4.3.3 Recruitment

Participants were recruited by Qualtrics. Qualtrics is an online research platform used extensively in business and academia and to which the University of Sydney holds a subscription. Qualtrics is an aggregator that recruits respondents from panels maintained by themselves and partner companies. Respondents are selected by Qualtrics from panels based on the profile requested by researchers and, in common with all online panels, respondents are compensated for their participation. As all recruitment for this survey was from Qualtrics partners the specific renumeration details are not known.

Recruiting a non-probability sample through an online panel such as Qualtrics, IPSOS Mori or Survey Sampling International (SSI) has some advantages. Recruitment is quick and relatively cheap, and providers generally undertake to manage the demographic compositions of their panels so that they are similar to national populations (Vehovar et al., 2016). However, according to Lehdonvirta et al. (2021), panel recruitment is susceptible to "economic self-selection bias" whereby participants weigh the financial cost benefit before deciding whether to respond. Lehdonvirta et al. (2021) conducted a study in Finland to compare the quality of the samples derived from online panels and those gathered via "river sampling" (the recruiting of respondents via a link in an email or digital media) with national demographic and non-demographic

benchmarks. They found that online panels are more representative of the population than "river sampling" and differ only slightly from national demographic and non-demographic benchmarks.

4.3.4 Delivery mode

Online survey delivery was deemed to be appropriate for the survey for a number of reasons. Rose et al. (2024 ch.10) have noted that delivering a survey online can reduce turnaround times and costs, allowing the researcher to involve participants who would otherwise be difficult to reach, reduce data collection and entry errors that can arise through manual data handling and may appeal to particular groups of respondents familiar with the online environment. The latter attribute is particularly relevant to this study whose subject is online shopping. In addition, Evans and Mathur (2018) explain that online surveys are easy to assemble, test and modify which allows researcher flexibility. This attribute is relevant to this survey where we require respondents to comment on a particular collaborative experience (click and collect, retailer parcel locker or location aware delivery app) with a particular brand. The online delivery of the survey allows us to customise the delivery of the questions to respondents based on these criteria. Evans and Mathur (2018) also noted that online delivery can facilitate forced completion which helps increase response rates.

4.3.5 Pilot phase and survey refinement

A pilot phase was conducted via Qualtrics to test the efficacy of the revised survey. Data was collected from 46 respondents on 15–16 March 2022. The pilot phase should be considered as a trial run of the whole study that tests the sampling and recruitment strategies, administration, data collection and analysis in field conditions (Ruel et al., 2016). Changes can be considered to any aspect of the study based on the results of the pilot phase.

The results from the pilot phase showed that the sampling methodology used by Qualtrics attracted respondents from every state in Australia, each gender, and all nominated income and education levels as required in the survey design. The pilot phase sample was not demographically representative of the Australian population, but this could not be expected given the small number of observations. All respondents answered all questions including nominating a collaborating retailer by name and the mode of collaboration they last participated in, which implied that the modified instructions and meaning of the questions seemed to be understood. The filtering questions were effective in ensuring all respondents were over 18 years of age and had collaborated with a retailer to receive an online delivery in the last 60 days. Retailer parcel locker users were underrepresented in the sample as only 3 of the 46 respondents nominated retailer parcel lockers

as the collaborative mechanism they use most frequently and only 1 respondent had used it most recently. However, we had anticipated an imbalance between the collaborative methods at the design stage and had therefore set a minimum quota of 65 responses for each category. We flagged the imbalance with Qualtrics who advised reaching the quota was not a concern. Based on the above, the pilot was considered satisfactory and no further changes were made to the wording of the questions or their order.

4.3.6 Data collection

Data collection was conducted in two phases. In the first phase between 6 and 28 April the quotas for click and collect and location aware delivery app responses were met and exceeded but the quota for retailer parcel locker responses was not met. In the second phase, conducted between 13 May and 2 June 2022, the survey was re-opened with responses restricted to parcel locker respondents until that quota was met. In total an additional 368 responses were gathered giving a total sample of 414.

Records were removed for three reasons. First, responses were removed if a retailer was not nominated as the seller of the goods. Having a retailer nominated by the respondent was an essential part of the survey design as it allowed us to test the importance of the brand relationship as an antecedent of motivation to collaborate. Second, responses were removed if the nominated retailer was known not to offer the selected service (e.g., McDonald's does not offer parcel locker pick up, Kogan does not offer click and collect). This was evidence of "satisficing" which is the tendency of respondents to provide satisfactory but not accurate or honest answers to questions (Krosnick, 1991; Preisendorfer & Wolter, 2014). Third, responses were removed if the survey was completed unreasonably quickly. "Speeding" is a well-known issue in web-based surveys. Qualtrics (2025) recommended reviewing responses completed in less than two standard deviations below the mean time for completion. However, owing to the large range of completion times (65 secs to 12,954 secs) a more qualitative approach was adopted. Zhang (2014) investigated the relationship between "speeding" and survey response quality and found that while it is difficult in practice to nominate an optimal completion time for a survey it is possible to correlate speeding with "straightlining". Straightlining occurs when respondents provide non-differentiated ratings to a series of statements and can be observed particularly when surveys include matrix-based questions such as Q7 in this survey (Appendix B). Responses provided in less than 105 seconds were removed on the basis that it was considered impractical for even an experienced panel member to

complete the survey satisfactorily in less than that time. We also removed responses to Q7 that displayed evidence of straightlining.

Based on the above criteria, 40 records were removed leaving a total of 374 valid responses for the analysis. This sample size is in line with similar studies (see Chapter 3) and is adequate to investigate the paths of the framework using the inverse square root method recommended by Kock and Hadaya (2018) at a significance level of 5% and minimum path coefficient of 0.2 in the SEM stage of the analysis.

Chapter 5 : Data Analysis and Results

5.1 Introduction

Chapter 4 outlined the development and validation of the survey instrument, as well as the sampling strategy and data collection procedures. The survey was designed using the tailored design method (Dillman et al., 2014) which emphasises aligning instrument design with the research context. Accordingly, the survey instrument reflected the explanatory and cross sectional nature of the study. Items used to test the hypotheses were drawn from peer-reviewed sources and aligned with both theoretical constructs and research objectives. Additional behavioural and demographic questions were included to enrich contextual understanding. A pretest with 23 respondents was conducted, resulting in minor refinements to the survey instructions to improve clarity.

The second section of Chapter 4 detailed the sampling and data collection procedures. A non-probabilistic, purposive sampling method was adopted to target a specific group of online shoppers who engage in collaborative last mile delivery, a group not yet well-defined in existing literature. Participants were recruited via an online panel provider (Qualtrics), selected for its speed, cost-efficiency, and ability to match national demographic profiles. A pilot survey completed by 46 respondents revealed no issues with comprehension. Data collection proceeded in two phases, using quotas to ensure representation across collaborative delivery types: click and collect, parcel lockers, and location aware delivery apps. After screening for invalid responses, such as failure to nominate a retailer or evidence of low-quality responses (e.g., straightlining, speeding), 40 cases were excluded, yielding a final sample of 374.

This chapter provides an overview of the dataset, and the results obtained from both the descriptive analysis and the testing of the structural model. Section 5.2 confirms that our sample broadly matches the demographic composition of Australia and that click and collect is the most popular collaborative service used by the respondents followed by parcel lockers and location aware delivery apps.

A descriptive analysis of the data can be found in Appendix F. It shows that respondents regularly use collaborative and non-collaborative (home delivery) delivery options and that respondents have a generally positive view of the value derived from collaboration. A net promoter-based

technique was applied to show that higher perceived value correlates with increased collaboration frequency. Additionally, respondents' ranking of the problems they experience with home delivery closely aligns with the benefits they experience by using collaborative services, suggesting collaboration is a solution to those problems. Finally, we provide tentative evidence that frequency of collaboration may be linked to metropolitan domicile.

Section 5.3 details the structural model design and testing. A hierarchical component model was used, with perceived value as a second-order construct formed by four first-order dimensions: economic, hedonic, social, and altruistic value. After confirming measurement reliability and validity, the structural model was assessed. The results partially support the proposed framework: perceived value (H1) and self-efficacy (H3) significantly influenced motivation to collaborate, while brand relationships, measured by brand trust and brand love (H2), had no significant effect. Although statistically significant, the model's explanatory power was weak ($R^2 = 0.129$), suggesting the need to explore additional factors or alternative structural relationships to better explain consumer motivation and behaviour in collaborative last mile logistics.

5.2 Overview of the collected data

At the end of the data collection period a total of 374 valid responses had been collected. Demographics

Table 5.11 shows the demographic composition of the the dataset for analysis. It is broadly representative of the Australian population as reported in the 2021 census (Australian Bureau of Statistics, 2021). There is a slight bias with income and university education being higher than the national population, however this is not unexpected given that the sample consists of online shoppers of varying frequency. Online shoppers have consistently been shown to be more educated and have higher incomes than the general population (Young 2020).

Table 5.11: Demographic profile of sample (n=374)

Characteristic		Sample %	Population %*
Gender	Female	51%	51%
	Male	48%	49%
Age	18–24	10%	11%
	25–34	25%	19%
	35–44	24%	18%
	45–55	15%	18%
	55+	25%	35%
State Domicile	Australian Capital Territory	2%	2%
	New South Wales	30%	32%
	Northern Territory	1%	1%
	Queensland	21%	20%
	South Australia	8%	7%
	Tasmania	2%	2%
	Victoria	27%	26%
	Western Australia	10%	11%
Household Annual Income	Under $25,000	5%	18%
	$25,000 to $49,999	19%	16%
	$50,000 to $99,999	32%	25%
	$100,000 to $199,999	30%	28%
	Over $200,000	9%	12%
	Rather not say	5%	N/A
Education	Year 11 or below	12%	23%
	Year 12	13%	17%
	Certificate III/IV	14%	24%
	Diploma/Advanced Diploma	12%	9%
	Bachelor's degree	33%	17%
	Graduate Diploma	3%	2%
	Postgraduate degree	13%	7%

* Based on Census data from Australian Bureau of Statistics (2021).

5.2.1 Collaboration type and frequency

We asked respondents which collaboration mode they last used (Q4) and which collaboration mode they use most frequently (Q25). The experience related to the collaboration mode they last used was then used as the context for the behavioural questions that followed. Recency is generally preferred over frequency in studies relating to consumer behaviour for several reasons which are summarized in the following table (Table 5.12).

Table 5. 12: Recency vs Frequency responses

Dimension	Recency-based Questions (e.g., "Think about your most recent click-and-collect experience")	Frequency-based Questions (e.g., "How many times have you used click-and-collect in the past 12 months?")
Memory Accuracy	Higher recall accuracy due to salience of recent events; reduces telescoping errors (Tourangeau, 2000)	Prone to recall errors and telescoping, especially over long time frames (Bradburn et al., 1987)
Contextual Richness	Anchored in a specific event; responses more concrete and comparable. Basis of critical incident technique. (Bitner et al., 1990)	Blends across heterogeneous experiences; hard to know which incidents are being evaluated.
Cognitive Burden	Lower burden; respondents recall a single event (Krosnick, 1991)	Higher burden; requires estimation, often imprecise or satisficed responses.
Predictive Power	More predictive of near-term satisfaction, loyalty, and intentions due to recency bias in decision making (Kahneman & Tversky, 1979)	May indicate long-term usage patterns but less predictive of current attitudes.
Suitability for Services	Captures service encounter variability (e.g., a poor or excellent last experience) (Bitner et al., 1990)	Misses situational impact of single critical experiences; averages may dilute effects.

Table 5.13 shows click and collect was the most frequently used collaborative mode among the respondents, followed by location aware tracking app and pick up from a retailer parcel locker. While there are some differences in the size of each group between last used and most frequently used, the rank order is consistent. We are not aware of any statistics that could be used to compare this mix of usage with industry usage or availability of each mode.

Table 5.13: Collaboration type and frequency

Collaboration Type	Q4. Last used	%	Q25. Used most often	%
CLICK AND COLLECT (pick up from a retail store)	182	48.7%	171	45.7%
Home Delivery using a RETAILER LOCATION AWARE TRACKING APP (a retailer app that allows you to track delivery e.g. Domino's Pizza Tracker)	141	37.7%	137	36.6%
Pick up from a RETAILER PARCEL LOCKER (pick up from a locker in a retail store excluding Australia Post)	51	15.9%	66	17.6%
Total	374	100.0%	374	100.0%

5.3 Structural model analysis

This section discusses the process of analysing the structural model. This begins with specifying the model and explaining the reasons for the choice of a hierarchical component model and the use of the two-stage disjoint approach to analyse it. Then we evaluate the measurement model for reliability and validity before evaluating the hypothesised relationships between the variables in the structural model.

5.3.1 Specifying the structural model

Structural models in PLS-SEM consist of two elements: the structural model itself, which describes the relationship between the latent variables; and the measurement model, which describes the relationships between the latent variables and their indicators. The structural model was designed to test the three hypotheses developed in Chapter 2 (Section 2.4) which in turn were based on insights from the literature review. The scales to measure the variables were taken from, and in some cases adapted from, reputable journals (Section 4.2.2). The full model is depicted in Figure 5.5. All variables in the model are measured reflectively. Reflective measurement was chosen because it was expected that there would be a high degree of correlation between the indicators (Hair et al., 2021 ch. 2).

The structural model depicted in Figure 5.5 is known in PLS-SEM as a hierarchical component model. This means it contains a higher order component (HOC) which is measured by several other lower components (LOCs). Hierarchical component models allow an extra level of abstraction beyond the latent variable layer. In this case the HOC is "Perceived Value," and the LOCs are economic, hedonic, social and altruistic value. As Sarstedt et al. (2019) explain, the hierarchical component design simplifies the number of path relationships in the model to allow a focus on those which are most important. ***H1*** *Perceived value is an antecedent of consumer motivation to collaborate with retailers in last mile logistics* requires us to measure the relationship between perceived value and collaboration frequency but not between the component parts of perceived value and the rest of the model.

A reflective-reflective (type 1) design was chosen for the hierarchical component model. In the Holbrook (2006) typology perceived value is conceived as consisting of four dimensions: economic, hedonic, social and altruistic. However, there is overlap in meaning between each of these dimensions which allows them to be combined interchangeably to measure higher level conceptions of value. Economic and social can be combined to measure "extrinsic" value, altruistic

and hedonic can be combined to measure "intrinsic" value, economic and hedonic can be combined to measure "self-orientated" value, and social and altruistic can be combined to measure "other orientated" value. Given the flexible nature of these combinations a high degree of correlation was expected between the dimensions of value suggesting reflective measurement of the higher order component (Hair et al., 2021 ch. 2). As discussed later in the chapter, this does come with a trade-off with respect to how the results can be interpreted, however the treatment of the variables in this way is methodologically more appropriate. Other model forms would be less robust given the composition of the indicator variables.

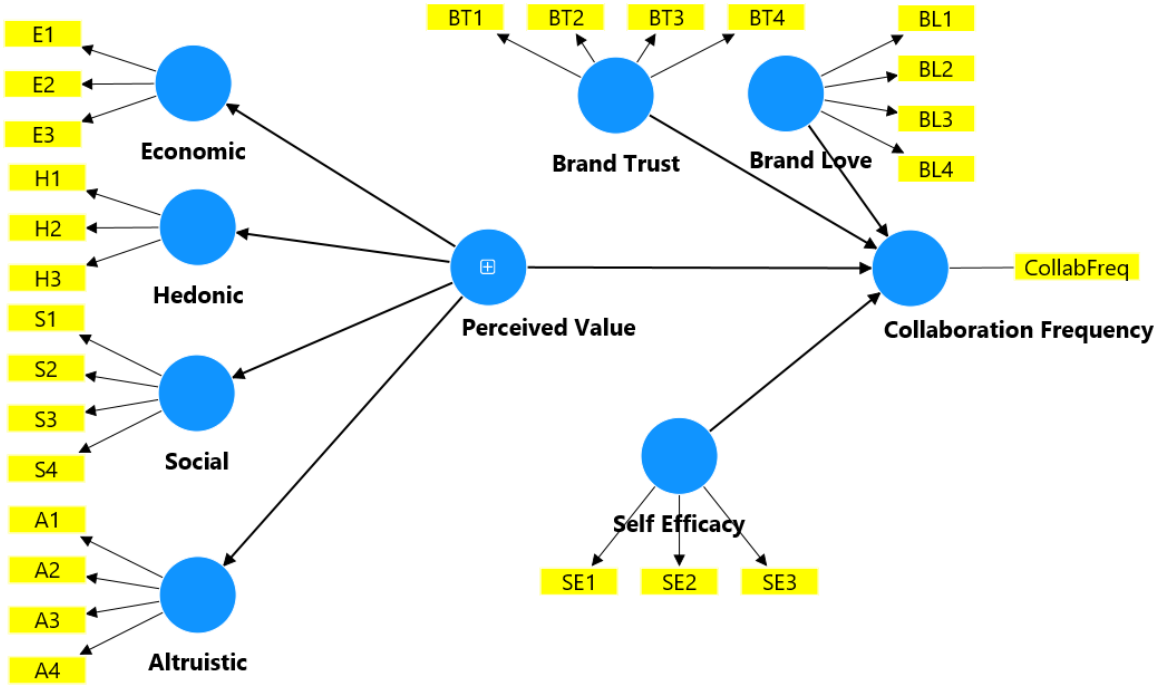

Figure 5.5: Hierarchical component model with indicators

Of the approaches available for measuring hierarchical component models, the disjoint two-stage approach was adopted because of its ease of implementation and comparable performance to other available approaches (Sarstedt et al., 2019). In the first stage, the higher order component is removed from the model and the lower order components are validated (Figure 5.6).

In the second stage, the higher order component is re-introduced, measured by the saved latent variable scores of the lower order components, and the model re-estimated (Figure 5.7). This allows validation of the higher order component and assessment of the measurement model itself.

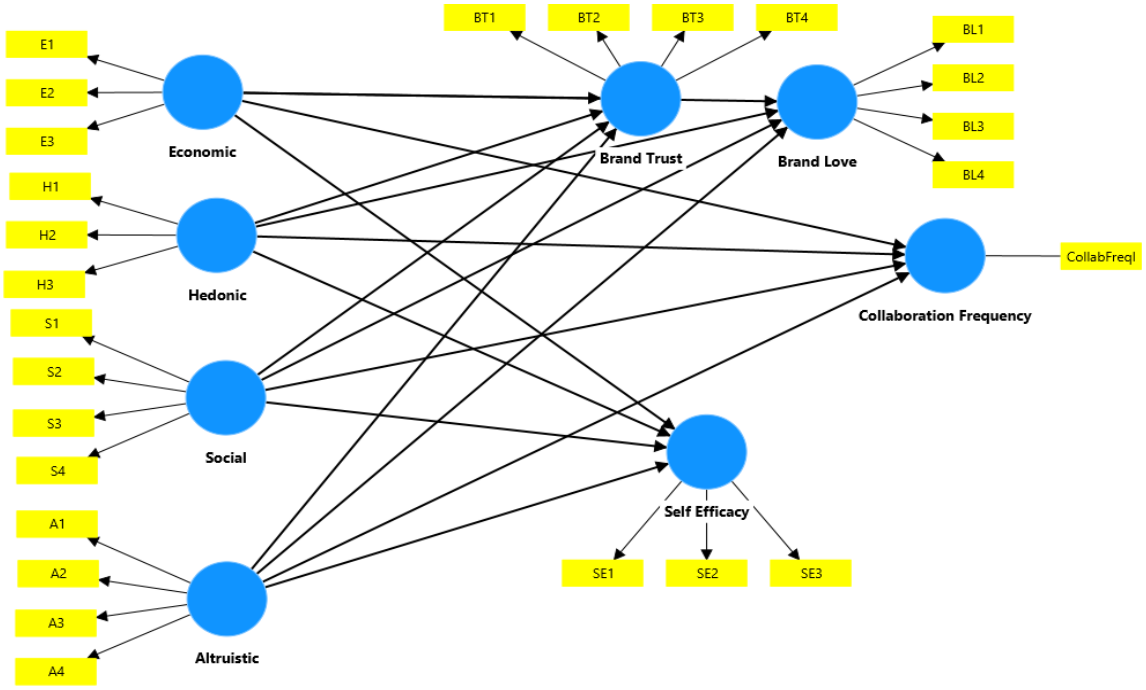

Figure 5.6: Disjoint two-stage approach – Stage 1 measurement model

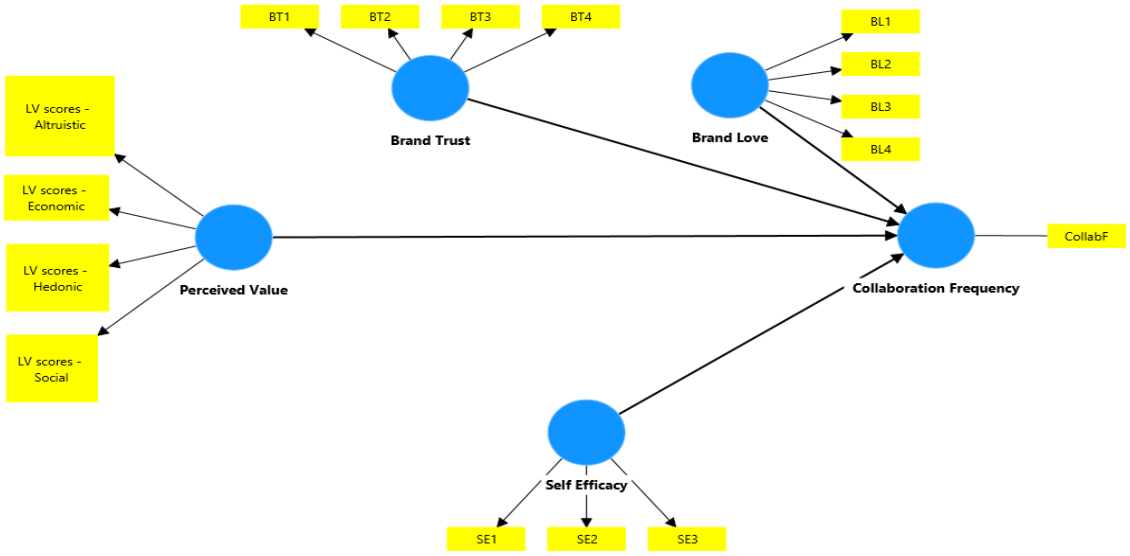

Figure 5.7: Disjoint two-stage approach – Stage 2 measurement model

5.3.2 Evaluation of the measurement model

The process of analysis adopted follows the recommendations of Sarstedt, Hair Jr et al. (2019). All the thresholds used are taken from Hair et al. (2021 ch. 4) unless otherwise stated.

Stage 1 measurement model: Assessment of lower order constructs. Table 5.19 shows outer loadings, indicator reliability, indicator consistency reliability and convergent validity for the stage 1 model. Indicator reliability of the lower order components is established because all the indicator

reliability scores are larger than the minimum recommended level of 0.5. Internal consistency reliability is established because all variables have Cronbach alpha or Rho A scores of more than 0.7 and below the maximum of 0.95. The scores for hedonic, social, altruistic and brand love, while under the maximum allowable, exceeded the preferred level of 0.9 suggesting possible redundant indicators. To identify any potentially redundant indicators, factor analysis was conducted in SPSS. In the correlation matrix S2 and S3 scored more than 0.8 when compared to the other indicators for social value. Removing these indicators had no significant impact on the model overall, therefore the indicators were retained. Convergent validity is established because the average variance extracted scores are greater than the acceptable threshold of 0.5.

Table 5.14: Indicator reliability, internal consistency reliability and convergent validity

Indicators	Loadings	Indicator Reliability	Cronbach's Alpha	Composite Reliability (rho_a)	Average variance extracted
E1	0.797	0.635	0.772	0.783	0.686
E2	0.837	0.701			
E3	0.849	0.721			
H1	0.906	0.821	0.912	0.923	0.850
H2	0.929	0.863			
H3	0.930	0.865			
S1	0.898	0.806	0.939	0.940	0.846
S2	0.938	0.880			
S3	0.934	0.872			
S4	0.907	0.823			
A1	0.891	0.794	0.929	0.930	0.824
A2	0.901	0.812			
A3	0.916	0.839			
A4	0.921	0.848			
BT1	0.797	0.635	0.857	0.890	0.693
BT2	0.839	0.704			
BT3	0.860	0.740			
BT4	0.831	0.691			
BL1	0.876	0.767	0.907	0.908	0.782
BL2	0.881	0.776			
BL3	0.914	0.835			
BL4	0.867	0.752			
SE1	0.874	0.764	0.877	0.878	0.803
SE2	0.919	0.845			
SE3	0.896	0.803			

Tables 5.20 and 5.21 show results of discriminant validity testing using the Fornell Larcker criterion and the heterotrait–monotrait ratio. The Fornell Larcker criterion compares the square root of each construct's AVE score with all other constructs in the model. If the measured construct's score is higher than that of the others in the model then the construct can be said to demonstrate discriminant validity. The heterotrait–monotrait ratio measures all pairwise correlations between variables. Pairwise scores of <0.9 are considered to demonstrate discriminant validity (Henseler et al., 2015).

The Fornell Larcker criteria were satisfied as each latent variable's score was found to be larger than its correlation with other latent variables. The heterotrait–monotrait ratio (HTMT) is the preferred measure of discriminant validity in PLS-SEM (Henseler et al., 2015). HTMT takes the average of all heterotrait–heteromethod correlations and divides it by the average of monotrait–heteromethod correlations.. A score close to 1 indicates a lack of discriminant validity. There is debate about the meaning of 'close to 1' but Henseler et al. (2015) have suggested a threshold of 0.9. In this instance, the relationship between social value and altruistic value (0.875) approaches that threshold. The potential lack of discriminant validity between these variables can be explained by theory. Social value and altruistic value are closely related concepts, being dimensions of "other value" in Holbrook's typology (2006). However, as all appropriate thresholds are in fact met, no change to the framework was considered necessary.

Table 5.15: Fornell Larcker criteria

	Altruistic	**Brand Love**	**Brand Trust**	**Economic**	**Hedonic**	**Self-efficacy**	**Social**
Altruistic	*0.907*						
Brand Love	0.481	*0.885*					
Brand Trust	0.413	0.649	*0.832*				
Economic	0.368	0.317	0.402	*0.828*			
Hedonic	0.606	0.575	0.435	0.504	*0.922*		
Self-efficacy	0.145	0.376	0.524	0.419	0.275	*0.896*	
Social	0.814	0.533	0.390	0.377	0.696	0.083	*0.920*

Table 5.16: Heterotrait–monotrait ratio

	Heterotrait-monotrait ratio (HTMT)		Heterotrait–monotrait ratio (HTMT)
Brand Love <-> Altruistic	0.523	Hedonic <-> Economic	0.592
Brand Trust <-> Altruistic	0.420	Self-Efficacy <-> Altruistic	0.160
Brand Trust <-> Brand Love	0.730	Self-Efficacy <-> Brand Love	0.422
Collaboration Frequency <-> Altruistic	0.302	Self-Efficacy <-> Brand Trust	0.616
Collaboration Frequency <-> Brand Love	0.181	Self-Efficacy <-> Collaboration Frequency	0.172
Collaboration Frequency <-> Brand Trust	0.149	Self-Efficacy <-> Economic	0.502
Economic <-> Altruistic	0.431	Self-Efficacy <-> Hedonic	0.302
Economic <-> Brand Love	0.374	Social <-> Altruistic	0.875
Economic <-> Brand Trust	0.478	Social <-> Brand Love	0.576
Economic <-> Collaboration Frequency	0.317	Social <-> Brand Trust	0.393
Hedonic <-> Altruistic	0.659	Social <-> Collaboration Frequency	0.293
Hedonic <-> Brand Love	0.627	Social <-> Economic	0.434
Hedonic <-> Brand Trust	0.461	Social <-> Hedonic	0.752
Hedonic <-> Collaboration Frequency	0.289	Social <-> Self-Efficacy	0.092

Stage 2 measurement model: Assessment of higher order constructs. Stage 2 begins by validating the perceived value HOC by assessing its relationship with the four reflective LOCs (economic, hedonic, social and altruistic) using their latent variable scores saved from stage 1. Table 5.22 shows HOC indicator reliability, indicator consistency reliability and convergent validity results. Indicator reliability is established for hedonic, social and altruistic values because their indicator reliability scores are larger than the minimum acceptable level of 0.5. The indicator reliability score for economic value is 0.468 which is less than the preferred level of 0.5 and its outer loading is 0.684 which is below the preferred level of 0.7. Hair et al. (2021 ch. 4) recommend removing indicators from a model when their outer loadings are less than 0.7 only when deleting the indicator leads to an increase in the internal consistency reliability or convergent validity above a threshold value. In this case, these measures are already above the relevant thresholds, so the economic value indicator was retained in the model. Internal consistency reliability is established by Cronbach alpha and Rho_A scores above 0.7 and below the maximum of 0.95. Convergent validity is established because the average variance extracted score is greater than the acceptable threshold of 0.5.

Table 5.17: Stage 2 measurement model: Higher order component indicator reliability, internal consistency reliability and convergent validity

Higher order component	Lower order component	Outer loadings	Indicator Reliability	Cronbach's alpha	Composite reliability (rho_a)	Average variance extracted (AVE)
Perceived Value	Economic	0.684	0.468	0.838	0.839	0.679
	Hedonic	0.854	0.729			
	Social	0.883	0.780			
	Altruistic	0.855	0.731			

Tables 5.23 and 5.24 show the results of discriminant validity testing of the perceived value higher order component using the Fornell Larcker criterion and the heterotrait–monotrait ratio. All thresholds are met in both tests meaning discriminant validity is established.

Table 5.18: Stage 2 measurement model: Fornell Larcker criteria

	Brand Love	Brand Trust	Perceived Value	Self-Efficacy
Brand Love	*0.882*			
Brand Trust	0.644	*0.823*		
Perceived Value	0.584	0.519	*0.823*	
Self-Efficacy	0.380	0.521	0.283	*0.895*

Table 5.19: Stage 2 measurement model: Heterotrait–monotrait ratio

	Heterotrait–monotrait ratio
Brand Trust <-> Brand Love	0.730
Collaboration Frequency <-> Brand Love	0.181
Collaboration Frequency <-> Brand Trust	0.149
Perceived Value <-> Brand Love	0.667
Perceived Value <-> Brand Trust	0.552
Perceived Value <-> Collaboration Frequency	0.378
Self-Efficacy <-> Brand Love	0.422
Self-Efficacy <-> Brand Trust	0.616
Self-Efficacy <-> Collaboration Frequency	0.172
Self-Efficacy <-> Perceived Value	0.329

5.3.3 Evaluation of the structural model

Having established the reliability and validity of the measurement model, we now evaluate the structural model in line with the recommendations of Hair et al. (2021 ch. 6). The structural model was assessed for collinearity using variance inflation factor scores for each latent variable (Table

5.25). The variance inflation factor measures the degree to which the standard error has been increased due to the presence of collinearity. As a rule of thumb, variance inflation factor values of 5 or above indicate critical collinearity and ideally all variance inflation factor values should be close to 3 or below. These benchmarks are met so the structural model can be said to be free from collinearity.

Table 5.20: Structural model collinearity test

	Variance inflation factor
Brand Love -> Collaboration Frequency	2.010
Brand Trust -> Collaboration Frequency	2.116
Perceived Value -> Collaboration Frequency	1.603
Self-Efficacy -> Collaboration Frequency	1.379

The in-sample predictive power of the model is measured by the coefficient of determination (R^2). In this case, perceived value, relationships (measured by brand trust and brand love) and systems and processes (measured by self-efficacy) explain 13% (0.129) of the variation in Collaboration Frequency, our proxy for motivation to collaborate (Table 5.26). Hair and Sarstedt (2019) explain that an R^2 result <0.25 can be considered weak; however, they also note that interpretation depends on context and the number of predictor constructs. In this case, one potential reason for the lower R^2 relative to other studies is that the dependent variable in the model is an ordinal scale of reported actual behaviour, rather than a series of statements indicating intended behaviour as typically used in other studies. The number of predictor constructs (4) is in the mid-range for PLS-SEM studies in the literature and cannot be considered a reason for the weak result. Another reason for low R^2 can be curvilinear data. A quadratic effect test was conducted which showed that while brand trust, brand love and self-efficacy have linear relationships with motivation to collaborate, the relationship with perceived value is non-linear (p=0.001). Analysis of the quadratic curve shows that Collaboration frequency grows at an accelerating rate as the perceived value of collaboration increases (Figure 5.12).

Table 5.21: In sample Predictive Power (R^2)

	Original sample (O)	Sample mean (M)	P values
Collaboration Frequency	0.129	0.140	0.000

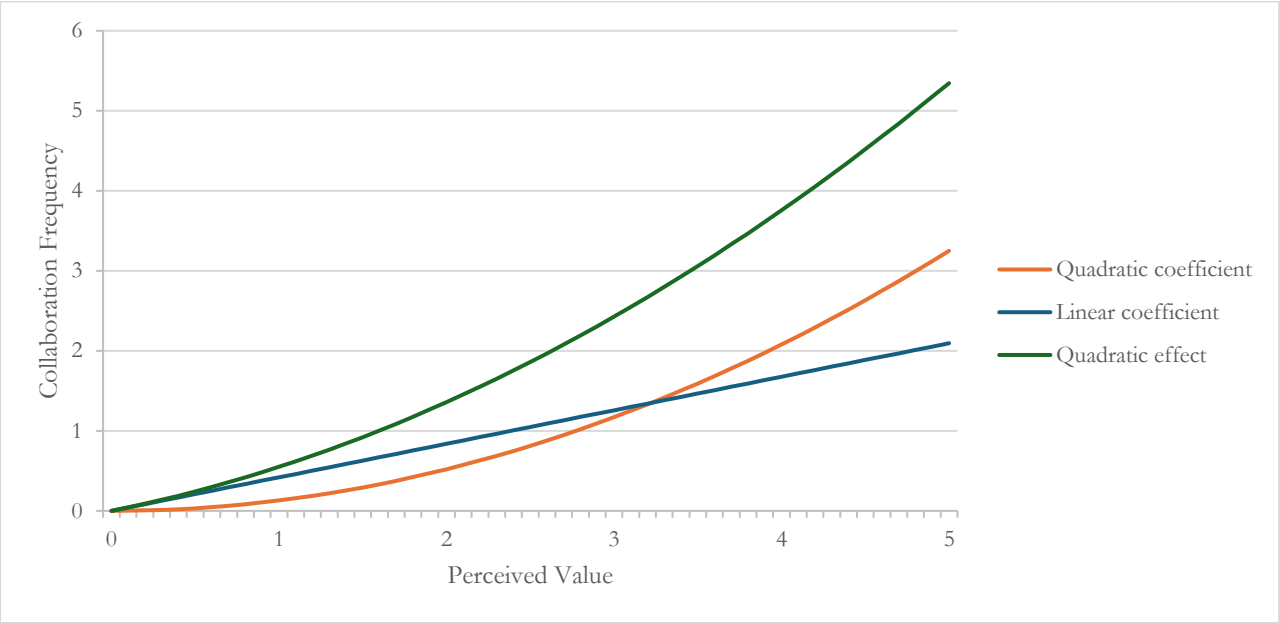

Figure 5.3: Quadratic effects between perceived value and collaboration frequency

The model's out of sample predictive power was tested using the approach suggested by Shmueli et al. (2016). The model was found to have strong predictive power having a positive Q^2 statistic and PLS-SEM root mean square error (RMSE) and mean absolute error (MAE) scores below linear regression model (LM) benchmarks (Table 5.27).

Table 5.22: Model out of sample predictive power

	Q^2 predict	PLS-SEM RMSE	PLS-SEM MAE	LM RMSE	LM MAE
Collaboration Frequency	0.103	1.028	0.863	1.053	0.879

The significance and relevance of the structural model relationships can be seen in Table 5.28. Perceived Value -> Collaboration Frequency is significant ($p<0.001$) and moderately relevant ($\beta=0.368$). This supports the first hypothesis (H1). It shows that consumers are motivated to collaborate principally by the same antecedent that motivates business to engage in SCC being perceived value. However, the perceived value consumers derive from collaboration is multidimensional. Economic, hedonic, social and altruistic are all valid and reliable indicators of perceived value in the model whereas the value derived by businesses from SCC normally observed

in the literature is economic only. However, the model was built reflectively which means the differential effects of each dimension of value on Collaboration Frequency were not tested.

Brand Trust -> Collaboration Frequency and Brand Love -> Collaboration Frequency are both insignificant. These two results mean that H2 is not supported. It shows that consumer relationships with retail brands do not influence collaboration through brand trust or higher levels of brand relationship as measured by brand love.

Self-Efficacy -> Collaboration Frequency is significant ($p<0.05$); however, the path coefficient ($\beta=0.107$) is weaker than that for perceived value. This supports the third hypothesis (H3). It shows that to become a collaborator in the supply chain consumers must have the perceived ability to navigate and effectively interact with retailer systems and processes.

Table 5.23: Significance and relevance of structural model relationships

		Path coefficients	T statistics	P values	95% confidence intervals		Significance (p<.05)
H1	Perceived Value -> Collaboration Frequency	0.368	5.814	0.000	0.367	0.063	Yes
H2a	Brand Trust -> Collaboration Frequency	-0.069	1.043	0.149	-0.052	0.066	No
H2b	Brand Love -> Collaboration Frequency	-0.029	0.385	0.350	-0.033	0.075	No
H3	Self-Efficacy -> Collaboration Frequency	0.107	1.885	0.030	0.104	0.057	Yes

A FIMIX-PLS test was conducted in SmartPLS4 to uncover any potential unobserved heterogeneity in the data. Three predetermined groups were tested being a single segment, two segments and three segments. The number of segments tested was based on rough calculations of the minimum sample size requirement for this study (see section 4.3.5) and the three collaborative modes included in the data. The results of the FIMIX-PLS analysis are shown in table 5.29

Sarstedt et al. (2011) advise that of the various measures of heterogeneity the most reliable are AIC3 and CAIC tests. These tests are both modifications of the Akaike information criteria, The lowest value for each test indicates the actual number of segments in the data. When the result is inconclusive the results can be combined, and the lowest net score used. In this case both tests indicate that there is only one segment in the data.

The normed entropy statistic (EN) reflects the quality of classification of individuals into the segments. Higher EN values are better. A commonly cited rule of thumb is that EN > 0.5 indicates acceptable separation between segments. In this case the EN scores are both <0.5 providing

further evidence that there are no unobserved segments in the data. This analysis supports the statistical treatment of the three collaborative modes as one segment of collaborative consumers

Table 5. 24 FIMIX-PLS test for unobserved heterogeneity

	Number of segments		
	1	2	3
AIC3 (modified AIC with Factor 3)	1024.827	1027.038	1025.617
CAIC (consistent AIC)	1044.448	1070.205	1092.329
EN (normed entropy statistic)	0	0.282	0.393

5.4 Interpreting the significance of the results

5.4.1 The influence of value

H1 is supported. The first hypothesis posits that perceived value (economic, hedonic, social and altruistic) is an antecedent of consumer motivation to collaborate with retailers in last mile logistics. This hypothesis is supported (β=0.368, $p<0.001$), indicating that, for consumers, perceived value is the principal antecedent of their motivation to collaborate in the retail supply chain. This aligns our study with social exchange theory which explains that actors in a network are motivated to act by the expectation of rewards (Emerson, 1976; Thibault & Kelley, 1959). It also aligns our study with numerous studies in the B2B and B2C literature that associate perceived value with motivation to collaborate (e.g., Afshan et al., 2018; Roberts et al., 2014; Zare et al., 2018).

The four measures of value (economic, hedonic, social and altruistic) were taken from the Holbrook typology (2006). Economic value refers to the utilitarian or functional benefits associated with cost-effectiveness and performance. In a last mile logistics context this refers to consumers' assessment of the practical worth derived from collaboration such as time saving or delivery certainty. Hedonic value refers to the experiential and emotional benefits gained from engaging with a product or service. Hedonic value may be generated if consumers gain pleasure, excitement or fun from their collaboration. Social value refers to the benefit of enhanced esteem consumers receive from a consumption experience. In last mile logistics this refers to the recognition consumers may gain from their social network as a result of their collaboration. Altruistic value refers to the satisfaction gained from providing a benefit to others. In last mile logistics this refers to the ethical or environmental benefits such as reduced emissions or packaging that may accrue as a result of collaboration.

The statistically valid link between perceptions of value and collaboration frequency was anticipated by the descriptive analysis (Appendix F). Analysis of the indicator average scores shows that consumers perceive value derived from collaboration in last mile logistics to be positive. Of the 14 indicators, 11 used to measure perceived value had scores significantly above the mid point while only 1 indicator was significantly below the mid point (Figure AF2). At a construct level, economic value has the highest average indicator scores and social value the lowest. This suggests that the practical worth that can be derived from collaboration such as time saving or delivery certainty is the most important factor to collaborating consumers and that the benefits gained from social esteem are the least important.

The descriptive analysis also explored the relationship between collaboration frequency and value perception using a technique derived from net promoter score (Reichheld, 2003). The first step of this analysis showed that economic value is the most important to consumers across all levels of Collaboration frequency followed by hedonic value and altruistic value. Social value gained a negative rating (Table AF3). These results support our previous observation that the practical benefits derived from collaboration are the most important to collaborating consumers but also show that hedonic value derived from the experience of collaborating and altruistic value derived from the potential benefits to the environment are also important.

The second step of the net promoter score analysis was to explore the relationship between value perception and collaboration frequency at four levels. The results (Table AF4and Figure AF3) show that perceptions of value are strongest among consumers with the highest collaboration frequency and generally decline as collaboration frequency declines. In addition, the types of value derived change with frequency of collaboration. Economic value has the strongest net positive scores across all levels of collaboration frequency. Hedonic value also has positive net scores across all levels of collaboration frequency, but they are lower. Perceptions of social and altruistic value from collaboration turn net negative when collaboration frequency is less than once per month. This demonstrates that all dimensions of value are important to the most frequent collaborators while only the practical and experiential benefits of collaboration are important to less frequent collaborators. This infers a threshold in value perception whereby consumers become regular collaborators.

Testing of the structural model (Model 1) showed that the influence of perceived value on collaboration frequency was statistically valid ($\beta=0.368$, $p<0.001$). However, on further examination we found that this influence was not linear. A quadratic effects test (Figure 5.12)

showed that the influence of perceived value on collaboration frequency is curvilinear with collaboration frequency increasing rapidly when thresholds of value perception have been met. A similar effect was inferred in the descriptive analysis (Table AF4, Figure AF3). The reasons why this might be the case are not apparent from our study and require further investigation.

The testing of Model 1 also shows that there are differences between the value that motivates businesses and consumers to collaborate. The scales used to measure value in the SCC literature consist of practical and tangible items like profitability, response times, revenue increases and cost control (see Section 2.3.1). Our study uses scales that measure four dimensions of value proposed by Holbrook (2006). The economic value scale, like those found in the SCC literature, measures practical and tangible outcomes but the hedonic, social and altruistic scales measure intangible concepts not considered in the B2B literature. Furthermore, we find that economic, hedonic, social and altruistic values to be valid and reliable reflective measures of perceived value in a B2C context. This observation aligns our findings with studies in the cocreation literature (Bettiga et al., 2017; Hussain et al., 2021). However, the methodologically appropriate reflective design used as a result of the overlapping nature of these indicator variables meant that testing of the relative influence of each dimension of value is not possible, thus no conclusions can be made regarding their relative degree of influence.

The significant influence of perceived value on collaboration frequency aligns our study with social exchange theory (Emerson, 1976; Thibault & Kelley, 1959). Social exchange theory explains that social behaviour is the result of an exchange process whose purpose is to maximise benefits and minimise costs. Consumers can therefore be motivated when superior value is offered by collaboration compared to non-collaborative market mechanisms such as home delivery. This represents a utilitarian approach to decision making where consumers focus on functional and goal-oriented benefits, a perspective well-established in consumer behaviour literature (Batra & Ahtola, 1991).

It also aligns consumer motivation to collaborate at a theoretical level with that of businesses. However, as we have seen consumers differ from businesses in being motivated by both tangible and intangible sources of value. As previously discussed, the design of Model 1 did not allow us to determine the relative importance of tangible and intangible sources of value to the motivation of consumers and this could form the basis of future investigations. The siginificant influence of value on collaboration frequency suggests that retailers need to maintain messaging that emphasises the utilitarian value offered by collaboration. This should encompass messages

emphasising delivery certainty. However the multidimensional perception of value demonstrated by the results means that messaging should extend beyond the purely practical to other attributes of collaboration such as the fun and potential environmental benefits that can be achieved through collaboration.

5.4.2 The influence of relationships

H2 is rejected. The second hypothesis posits that the strength of consumer relationships with retailers is an antecedent of consumer motivation to collaborate with retailers in last mile logistics. The effects of both **H2a** brand trust (p=0.149) and **H2b** brand love (p=0.350) on collaboration frequency are statistically insignificant. This is a surprising but important finding. It was expected, based on social exchange theory and our review of the B2B collaboration and B2C collaboration literature, that consumers would be more motivated to collaborate with retail brands they trust and are committed to. For example, in the B2B collaboration literature social exchange theory is used to demonstrate that social relationships between supply chain partners are formed and maintained because the partners offer reciprocal benefits to one another through collaboration over time. For example Wu et al. (2014) used social exchange theory to test the effect of relational constructs (trust, commitment, reciprocity and power) on information sharing and SCC, finding positive and significant effects in both cases. Similarly, in the B2C literature, Wallace, Torres et al. (2021) found that consumers who trust a brand are more willing to cocreate value with it and that these effects are enhanced when the brand is loved.

Our findings therefore diverge from the reviewed B2B and B2C studies, suggesting that motivation to collaborate in the last mile logistics context does not rely directly on a consumer's relationship with the brand. One plausible explanation is that collaboration frequency in this setting is seen by consumers as a pragmatic, utilitarian choice influenced more by convenience and situational factors than by emotional attachment. Consumers may engage in collaboration because it meets functional needs (e.g., avoiding missed deliveries), regardless of their broader relationship with the brand. Additionally, it is possible that brand trust and love exert indirect effects, for example, by shaping perceived value or reducing perceived risk, rather than directly influencing behaviour.

Another consideration is that measurement design may have limited our ability to detect differential effects between groups of consumers. The relationship variables were assessed in a general context. Future studies might examine whether specific customer segments, such as very frequent collaborators (more than once a week), or loyalty program members, are more influenced by brand relationships than low frequency, non-loyalty program members when deciding whether

to collaborate. Alternatively, contextual influences excluded from the design of Model 1, such as demographic characteristics, personality type, risk and product category, may influence the strength of relational influences on collaboration motivation.

Our findings suggest that retailers need not focus their recruitment strategies on customers who are known to be engaged with the brand. Instead, it is likely that above the line messaging to the general population of online shoppers emphasising the utilitarian and other value to be gained from collaboration will be more effective.

5.4.3 The influence of systems and processes

H3 is supported. The third hypothesis posits that the perceived ability of consumers to successfully interact with retailer systems and processes, demonstrated by their self-efficacy, is an antecedent of consumer motivation to collaborate in last mile logistics. This hypothesis is supported ($\beta=0.107$, $p<0.05$). Self-efficacy, as defined by Bandura (1978, 1997), is the belief in one's ability to execute behaviours necessary to produce desired outcomes. In this context, it reflects a consumer's confidence in managing tasks such as selecting alternative delivery modes, navigating retailer apps, or following instructions for pick up. Self-efficacy differs from the measures commonly used in a B2B context (SCC literature), such as information sharing and interorganisational systems. However, what the B2B and B2C measures share is the premise that effective collaboration depends on users' ability to engage with enabling systems.

The relevance of self-efficacy to motivation to collaborate ($\beta=0.107$) is modest, however it is broadly comparable ($\beta<0.2$) with the effects of some of the elements of systems and processes reported in the SCC literature. For example, Lee et al. (2010) measured the effect of information quality on operational and strategic collaboration and reported significant effects of $\beta=0.151$ and $\beta=0.175$, respectively. Richey et al. (2012) measured the influence of technology complementarity on collaboration and reported a significant effect of $\beta=0.175$. We conclude that systems and processes are antecedents of motivation to collaborate in B2B and B2C domains but that the triggers differ.

Our findings suggest that to improve uptake of collaboration in last mile logistics retailers should make the tools consumers need to facilitate collaboration as easy to use as possible. This could mean improving app design, providing onboarding tutorials, and reducing the number of steps required in the process of collaboration. Prior studies have demonstrated the importance of ease

of use in adoption of parcel locker services (e.g., An et al., 2022; Lemke et al., 2016) and our findings suggest that the same may apply to click and collect and location aware delivery app use.

What ease of use means in design terms is likely to be context specific and dependent on factors such as digital literacy, age, and prior experience of customers. While the effects of self-efficacy are modest, they should not be overlooked. Given the exploratory nature of this study and the complex behavioural context, even small effects can be meaningful.

5.4.4 Model predictive power

A feature of the results is the relatively low influence of perceived value, relationships, and systems and processes on consumer motivation to collaborate with retailers in last mile logistics. The R^2 of the model is 0.129, but it is difficult to fully interpret this figure. A large number of PLS-SEM models define behaviour as a composite measure of likely actions, in a similar fashion to the indicator item sets designed to measure theorised attitudes. Such measures typically require respondents to express strength of agreement with likely behaviours, the responses to which are in turn more likely to be more heavily correlated with each other, and also with the responses provided on the attitudinal indicators. In this study, the dependent variable is just one measure: reported frequency of collaboration. Further, our aim in this study was to apply a generic framework derived primarily from the SCC literature (B2B context) to the growing consumer last mile logistics space (B2C context). As a pioneering study in this domain, we established a first (and arguably important) benchmark for such a model of consumer collaboration in last mile logistics. While the "lower" R^2 value may occur due to these differences, another important interpretation is that a lower value also indicates that this framework simply does not fit the consumer last mile logistics context as well as it does the B2B context. Additional research is needed to further refine the proposed framework to explain all aspects of consumers' motivation to collaborate in supply chains, particularly in the growing space of last mile logistics.

Chapter 6 : Revised and Extended Framework

6.1 Introduction

Chapter 5 presented data analysis and results from our investigation of the antecedents of consumer motivation to collaborate in last mile logistics. Section 5.2 profiled the data collected from 374 Australian online shoppers showing that the sample closely matched the demographic profile of Australia and contained a mix of click and collect, parcel locker and location aware delivery app collaborators. The descriptive analysis in Appendix F provided background and context for the statistical analysis. It showed that our sample contained shoppers who collaborate in last mile logistics at various frequencies but also used non-collaborative methods (home delivery) as well. Average indicator scores showed that respondents perceive value in collaboration across all value dimensions and that the utilitarian benefits from collaboration, represented by economic value, had the highest scores. Using a technique similar to net promoter score we showed those perceptions of value in collaboration are linked to collaboration frequency. The responses to a series of background questions intended to reveal problems experienced with home delivery also showed that the respondents saw collaboration as a remedy to these problems.

In Section 5.3 we analysed the structural model (Model 1) which was designed to test three hypotheses developed from a review of the SCC literature, supplemented by selected articles from the marketing cocreation literature, in Chapter 2. Model 1 was analysed using PLS-SEM, whose selection was justified in Chapter 4, with SmartPLS4 software. The analysis showed that consumer motivation to collaborate with retailers in last mile logistics can only partially be explained by Model 1. Perceived value (H1) and the perceived ability of consumers to successfully interact with retailer systems and processes, demonstrated by their self-efficacy (H3), were shown to be significant antecedent influences on motivation to collaborate yet, somewhat surprisingly, the influence of consumer relationships with retailers, measured by brand trust and brand love, was found to be insignificant. Furthermore, the combined antecedent influence of perceived value and self-efficacy on motivation to collaborate, albeit significant, was weak suggesting that either other influences not included in Model 1, or a different interplay of the factors considered that better suits motivation and behaviour, need to be identified and tested.

In this chapter we propose a revised and extended framework of consumer motivation to collaborate in last mile logistics (Model 2) that addresses some of the questions raised by our analysis of the initial framework (Model 1). Section 6.2 explains and justifies the design of Model 2 then Section 6.3 tests Model 2 using the data collected to test Model 1. Section 6.4 interprets the results of the testing of Model 2 and discusses its suitability for further testing using primary data.

6.2 Specifying Model 2

Model 1 was designed to be a generic depiction of the antecedents of consumers to collaborate in the supply chain. For that reason, a number of potential relationships between variables were not explored. To extend the insights gained from Model 1 some new relationships are explored in Model 2 based on questions raised in the analysis of Model 1. First, while Model 1 demonstrated the antecedent influence of perceived value on motivation to collaborate and showed economic, hedonic, social and altruistic value to be reliable reflective indicators, it did not test the influence of individual dimensions of perceived value on motivation to collaborate. Second, while Model 1 tested the direct antecedent effects of relationships on motivation to collaborate it did not test their possible indirect antecedent influence. This was because the majority of studies in both the SCC and consumer cocreation literature found the relationship to be direct, and our purpose was to test a generic model. Third, Model 1 did not include context as an antecedent of motivation to collaborate. This was because Model 1 was intended to be a generic, not context specific, model of consumer supply chain collaboration motivation. Various contextual influences have been shown to be significant in both the B2B literature (e.g., Mora-Monge et al., 2019; Wu & Chiu, 2018; Wu et al., 2014) and B2C literature (Cambra-Fierro et al., 2017; Füller & Bilgram, 2017) but they were not considered appropriate for inclusion in a generic model.

This chapter addresses three questions: (1) What is the antecedent influence of different types of perceived value on consumer motivation to collaborate in last mile logistics? (2) Can consumer motivation to collaborate in last mile logistics be conceived as a two-stage process as opposed to the single-stage process observed in the B2B collaboration literature and tested in Model 1? (3) Are demographic factors contextual antecedents of the proposed first and second stages of consumer motivation to collaborate in last mile logistics?. Answering these questions will justify the design of Model 2 and contribute to the academic literature by extending our understanding of the antecedent influences on consumer motivation to collaborate in the supply chain. It will also extend our understanding of the differences between business and consumer motivation to engage in SCC. For practitioners, justifying the extended framework will help identify specific

dimensions of perceived value that influence motivation to collaborate and will allow retailers to build service offerings that encourage wider adoption of collaborative services among consumers. It will also allow retailers to determine if B2C collaboration is a two-stage process, thus allowing retailers to better manage B2C collaboration programs. Finally, the identification of specific contextual influences on motivation to collaborate is important for retailers hoping to target easily identifiable groups of customers as potential last mile logistics collaborators.

To answer these questions, we adopt an exploratory approach that draws on insights from the testing of Model 1, the B2B and B2C collaboration literature, and practice.

6.2.1 Value dimensions

The first question we explore is what is the antecedent influence of different types of perceived value on consumer motivation to collaborate in last mile logistics. The Holbrook (Holbrook, 2006) typology of value selected for this study allows us to measure the antecedent effects of value in three different ways: (1) a four-dimensional perspective in which the effects of economic, hedonic, social and altruistic value can be tested separately, versus (2) a two-dimensional perspective in which extrinsic motivation (driven by a desire for external rewards or recognition and measured by economic and social value) can be compared with intrinsic motivation (a desire to enjoy the task for its own sake and measured by hedonic and altruistic value) (Deci & Ryan, 1985; Deci & Ryan, 2000), versus (3) a two-dimensional perspective in which self-orientated value (where a product or service experience is valued because of its effect on the receiver and measured by economic and hedonic value) can be compared to other-orientated value (where a product or service experience is valued because of its effect on others and measured by social and altruistic value).

To determine which of the three conceptions of value to include in our extended framework, we conducted preliminary testing using the data collected to test Model 1 with SmartPLS4 and SPSS21. First, we tested the direct influence of each dimension of value on collaboration frequency. Only economic value was shown to have a significant relationship with collaboration frequency (Table 6.30) so this four-dimensional conception of value was rejected.

Table 6.25: Influence of four value dimensions on collaboration frequency

	Path coefficient	T statistics	P values	95% confidence intervals		Significant (p<0.05)
Economic Value -> Collaboration Frequency	0.181	3.372	0.001	0.185	0.054	Yes
Hedonic Value -> Collaboration Frequency	0.074	1.071	0.284	0.071	0.069	No
Social Value -> Collaboration Frequency	0.093	1.030	0.303	0.093	0.090	No
Altruistic Value -> Collaboration Frequency	0.115	1.369	0.171	0.117	0.084	No

Next, we tested which two-dimensional concept of value (intrinsic vs extrinsic or self-orientated vs other-orientated) would be the best fit for the extended framework. To do this, factor analysis was conducted in SPSS. As both options offer a two-dimensional conception of value, factor extraction was limited to two factors. The analysis showed that two factors explain 70% of the variation (Table 6.31) and pattern analysis confirmed these factors to be other-orientated value (social and altruistic) and self-orientated value (economic and hedonic) (Table 6.32). The validity of the results was confirmed by the Kaiser–Meyer–Olkin test for sampling adequacy (>0.5) and Bartlett's test of sphericity (p<0.001). These results mean a two-dimensional conception of value, self-orientated vs other-orientated, was adopted for the extended framework.

Table 6.26: Extraction of two factors using principal component analysis

Compon -ent	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total
1	8.054	57.526	57.526	8.054	57.526	57.526	7.764
2	1.763	12.589	70.115	1.763	12.589	70.115	3.949
3	1.005	7.177	77.292				
4	0.589	4.207	81.499				
5	0.490	3.500	84.999				
6	0.416	2.972	87.971				
7	0.296	2.115	90.086				
8	0.289	2.063	92.149				
9	0.252	1.800	93.949				
10	0.212	1.513	95.462				
11	0.185	1.320	96.782				
12	0.173	1.234	98.016				
13	0.155	1.106	99.123				
14	0.123	0.877	100.000				

Table 6.27: Pattern analysis of factors

	Component	
	1	2
Economic Value 1	-0.150	0.834
Economic Value 2	0.110	0.763
Economic Value 3	0.013	0.777
Hedonic Value 1	0.550	0.363
Hedonic Value 2	0.539	0.431
Hedonic Value 3	0.513	0.462
Social Value 1	0.792	0.131
Social Value 2	0.890	-0.010
Social Value 3	0.911	-0.046
Social Value 4	0.912	-0.064
Altruistic Value 1	0.914	-0.071
Altruistic Value 2	0.823	-0.021
Altruistic Value 3	0.858	-0.057
Altruistic Value 4	0.883	-0.052
Extraction Method: Principal Component Analysis.		
Rotation Method: Oblimin with Kaiser Normalisation.		

6.2.2 Two-stage consumer motivation process

The second question we explore is whether consumer motivation to collaborate in last mile logistics can be conceived as a two-stage process as opposed to the single-stage process observed in the B2B collaboration literature and tested in Model 1. The difference in process stages can be explained by the difference in commitment required to become a consumer collaborator as opposed to a B2B collaborator. For a consumer, collaboration can be casual. They can choose to receive an online order from a particular retailer through a collaborative process on one day then revert to being a non-collaborative receiver of a home delivery from the same retailer on the next day. In the descriptive analysis (Appendix F) 1 we showed that our respondents collaborate in last mile logistics but also receive online orders via home delivery. Consumers can even choose to opt out of online ordering completely and shop in a bricks-and-mortar store. There are no costs or penalties for making the switch.

In contrast, B2B collaboration requires a significant commitment of resources. For example, it requires investment by each collaborator in systems and processes to support information sharing, development of protocols on what information will be shared and in what circumstances, and the formation of interorganisational teams to manage their collaborative efforts. These resource investments create significant barriers to switching between collaborative and transactional modes

once SCC has been established. The link between trust, commitment and resource sharing is described in commitment trust theory (Morgan & Hunt, 1994).

Based on the above, we propose that there are two stages to motivating a consumer to collaborate with a retailer in last mile logistics. In the first stage the consumer perceives value in collaboration but may remain a casual collaborator. In the second stage the consumer is motivated to become a committed, regular collaborator. Model 1 tested the second part of this proposition but not the first. We further propose that consumer perceptions of value in collaboration are formed through their relationships with the brand, as measured by brand trust and brand love, and their perceived ability to navigate retailer systems and processes as measured by self-efficacy. These are of course very similar to the hypothesised antecedents of motivation to collaborate tested in Model 1. However, we now propose that both stages involve acts of collaboration and therefore share similar antecedents.

To test whether brand relationships and self-efficacy should be included in our extended framework, we tested their antecedent influence on self-orientated and other-orientated value. As can be seen in Table 6.33 all the effects were significant. These variables will therefore be included in Model 2.

Table 6.28: Antecedents of perceived value in collaboration

	Path coefficient	T statistics	P values	95% confidence intervals		Significant (p<0.05)
Brand Love -> Other Value	0.463	6.887	0.000	0.465	0.067	Yes
Brand Love -> Self Value	0.391	5.941	0.000	0.394	0.066	Yes
Brand Trust -> Other Value	0.205	3.054	0.002	0.207	0.067	Yes
Brand Trust -> Self Value	0.154	2.159	0.031	0.156	0.071	Yes
Self-Efficacy -> Other Value	-0.166	3.168	0.002	-0.168	0.052	Yes
Self-Efficacy -> Self Value	0.148	2.485	0.013	0.148	0.059	Yes

6.2.3 Demographic context

The third question we explore is whether demographic factors influence the first and/or second stage of consumer motivation to collaborate in last mile logistics. Various contextual influences on consumer motivation to cocreate can be observed in the literature including demographic characteristics (Chatterjee et al., 2023), personality type and product type (Zare et al., 2018), uncertainty and risk (Mainardes et al., 2017) and culture (Grott et al., 2019). Contextual factors were not included in Model 1 as our intent was to test a generic model of consumer motivation to

collaborate in the supply chain in the last mile logistics domain. The survey designed to support the testing of Model 1 collected demographic data (age, gender, income, education) which form the contextual variables here. To test which of these demographic factors should be included in the extended framework, the significance of their relationships with the other variables was tested. As can be seen in Table 6.34, only age and education have significant relationships with the endogenous variables at the proposed first and second stages of motivation to collaborate. Age and education are therefore included in the extended framework which is presented in Figure 6.13.

Table 6.29: Significance of influence of demographic variables on endogenous variables

	Path coefficient	T statistics	P values	95% confidence intervals		Significant (p<0.05)
Age -> Collaboration Frequency	-0.088	2.071	0.038	-0.089	0.043	Yes
Age -> Other Value	-0.169	4.575	0.000	-0.169	0.037	Yes
Age -> Self Value	-0.083	3.182	0.001	-0.083	0.026	Yes
Education -> Collaboration Frequency	0.142	4.000	0.000	0.142	0.035	Yes
Education -> Other Value	0.090	3.130	0.002	0.090	0.029	Yes
Education -> Self Value	0.043	1.999	0.046	0.043	0.022	Yes
Gender -> Collaboration Frequency	-0.062	0.637	0.524	-0.062	0.097	No
Gender -> Other Value	-0.049	0.582	0.561	-0.048	0.084	No
Gender -> Self Value	0.035	0.567	0.571	0.037	0.062	No
Income -> Collaboration Frequency	0.033	0.683	0.495	0.034	0.049	No
Income -> Other Value	-0.008	0.197	0.844	-0.007	0.041	No
Income -> Self Value	0.012	0.414	0.679	0.013	0.029	No

6.2.4 Introducing Model 2

Model 2 is depicted in Figure 6.13. It is designed to allow us to address the questions raised by the analysis of Model 1. It depicts consumer collaboration as a two-stage process, as presented in Section 6.2.2.

Stage 1: Consumers perceive value in collaboration influenced by brand relationships, their self-efficacy in relation to navigating retailer systems and processes, and demographic context (age and education).

Stage 2: Consumers are influenced to become regular collaborators by the value they perceive in collaboration, their self-efficacy and demographic context.

The main differences between Model 2 and Model 1 are as follows:

- Perceived value is now shown influencing collaboration frequency in two dimensions: "self-orientated" (economic and hedonic) and "other-orientated" (social and altruistic) as determined by the analysis conducted in Section 6.2.1.
- Two demographic contextual influences, education and age, are introduced based on the analysis conducted in Section 6.2.3. This means all four of the antecedent influences on consumer collaboration motivation identified in Chapter 2 are now represented in Model 2.
- The influence of each of the antecedent influences on collaboration motivation (perceived value, relationships, systems and processes, and context) are depicted at both stages with the exception of relationships. Relationships, as measured by brand trust and brand love, were found to have an insignificant effect on collaboration frequency in the testing of Model 1 and were therefore omitted from the second stage of Model 2. However, its antecedent effect on perceptions of value is included in stage 1.

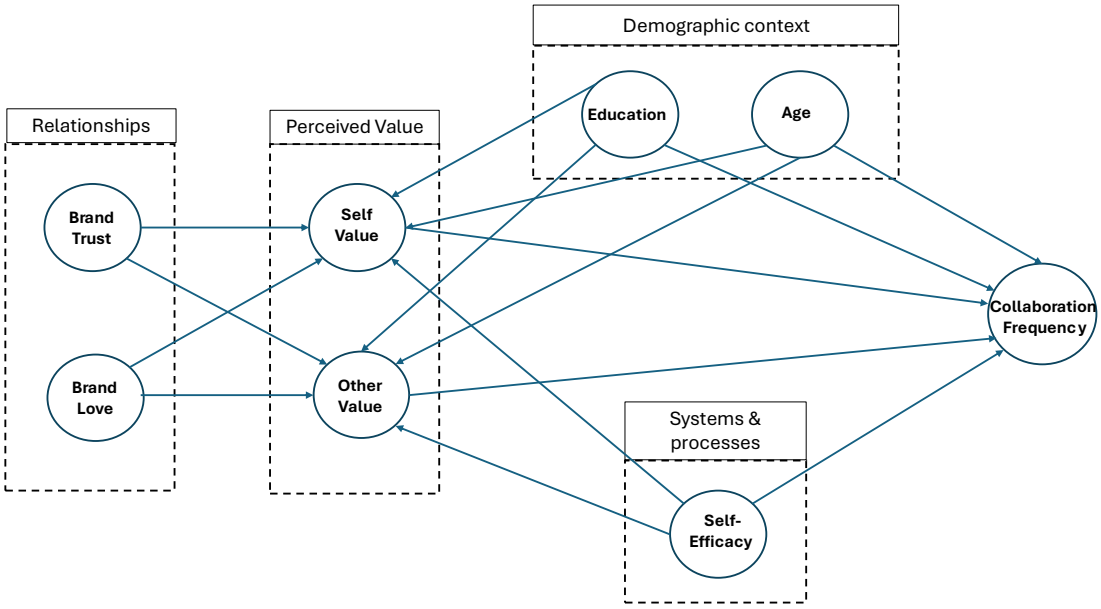

Figure 6.4: Proposed extended framework of consumer motivation to collaborate in last mile logistics (Model 2)

6.3 Analysis of Model 2

This section estimates Model 2 to examine the relationships between the indicators and constructs and the relationships between the constructs using the data previously collected to estimate Model 1. This allows us to determine the quality of the model and its suitability for further testing.

6.3.1 Estimating the measurement model

Model 2 was estimated without the indicator S3 "It makes a good impression on other people", one of four indicators of social value in our survey. S3 was removed because of collinearity issues found in initial testing. S3 generated a variance inflation factor score > 5 which is above the maximum threshold recommended by Hair et al. (2021 ch. 6)

Indicator reliability, internal consistency reliability, and convergent validity: Indicator reliability was established for other-orientated value, brand trust, brand love and self-efficacy because their indicator reliability scores were all larger than the minimum acceptable level of 0.5 (Table 6.6). The indicator reliability scores for two indicators of self-orientated value were below the preferred threshold of 0.5 (E1=0.335, E3=0.464) and their outer loadings were below the preferred threshold of 0.7 (E1=0.579, E3=0.681). Hair et al. (2021 ch. 3) recommended removing indicators from a model when their outer loadings are less than 0.7 only when deleting the indicator leads to an increase in the internal consistency reliability or convergent validity above a threshold value. In this case, these measures are already above the relevant thresholds (see Table 6.35), so E1 and E2 were retained in the model. Internal consistency reliability was established by Cronbach alpha and Rho_A scores above 0.7 and below the maximum of 0.95. Convergent validity was established because the average variance extracted scores were greater than the acceptable threshold of 0.5.

Table 6.30: Indicator reliability, internal consistency reliability and convergent validity

Latent Variable	Indicator	Outer loadings	Indicator reliability	Cronbach's alpha	Composite reliability (rho_a)	Average variance extracted (AVE)
Self-orientated value	E1	0.579	0.335	0.852	0.875	0.580
	E2	0.730	0.533			
	E3	0.681	0.464			
	H1	0.810	0.656			
	H2	0.860	0.740			
	H3	0.867	0.752			
Other-orientated value	S1	0.854	0.729	0.936	0.937	0.759
	S2	0.889	0.790			
	S4	0.888	0.789			
	A1	0.896	0.803			
	A2	0.840	0.706			
	A3	0.856	0.733			
Brand Trust	BT1	0.806	0.650	0.857	0.904	0.690
	BT2	0.835	0.697			
	BT3	0.855	0.731			
	BT4	0.825	0.681			
Brand Love	BL1	0.911	0.830	0.893	0.894	0.823
	BL2	0.912	0.832			
	BL3	0.899	0.808			
Self-Efficacy	SE1	0.883	0.780	0.877	0.878	0.803
	SE2	0.913	0.834			
	SE3	0.892	0.796			

Discriminant validity: Tables 6.36 and 6.37 show the results of discriminant validity testing of the perceived value higher order component using the Fornell Larcker criterion and the heterotrait–monotrait ratio. All test conditions are fulfilled meaning discriminant validity is established

Table 6.31: Fornell Larcker criteria*

	Age	Brand Love	Brand Trust	Collabora-tion frequency	Educa-tion	Other Value	Self-Efficacy	Self Value
Age	1.000							
Brand Love	-0.044	0.907						
Brand Trust	0.076	0.643	0.831					
Collaboration frequency	-0.181	0.147	0.152	1.000				
Education	-0.116	-0.082	-0.085	0.269	1.000			
Other Value	-0.248	0.507	0.422	0.308	0.123	0.871		
Self-Efficacy	0.097	0.361	0.525	0.162	-0.024	0.122	0.896	
Self Value	-0.152	0.526	0.485	0.319	0.070	0.650	0.381	0.761

*Fornell Larcker criteria compare the square root of each construct's AVE score with all other constructs in the model. If the measured construct's score is higher than that of the others in the model then the construct can be said to demonstrate discriminant validity. The heterotrait–monotrait ratio measures all pairwise correlations between variables. Pairwise scores of <0.9 are considered to demonstrate discriminant validity (Henseler et al., 2015).

Table 6.32: Heterotrait–monotrait ratio

	Heterotrait–monotrait ratio (HTMT)		Heterotrait–monotrait ratio (HTMT)
Brand Love <-> Age	0.047	Other Value <-> Education	0.127
Brand Trust <-> Age	0.108	Self-Efficacy <-> Age	0.104
Brand Trust <-> Brand Love	0.730	Self-Efficacy <-> Brand Love	0.408
Collaboration Frequency <-> Age	0.181	Self-Efficacy <-> Brand Trust	0.616
Collaboration Frequency <-> Brand Love	0.155	Self-Efficacy <-> Collaboration Frequency	0.172
Collaboration Frequency <-> Brand Trust	0.149	Self-Efficacy <-> Education	0.027
Education <-> Age	0.116	Self-Efficacy <-> Other Value	0.135
Education <-> Brand Love	0.088	Self Value <-> Age	0.149
Education <-> Brand Trust	0.088	Self Value <-> Brand Love	0.577
Education <-> Collaboration Frequency	0.269	Self Value <-> Brand Trust	0.539
Other Value <-> Age	0.256	Self Value <-> Collaboration Frequency	0.347
Other Value <-> Brand Love	0.553	Self Value <-> Education	0.089
Other Value <-> Brand Trust	0.425	Self Value <-> Other Value	0.703
Other Value <-> Collaboration Frequency	0.318	Self-Value <-> Self Efficacy	0.452

6.3.2 Estimating the structural model

Having established the reliability and validity of the measurement model, we now evaluate the structural model in line with the recommendations of Hair et al. (2021 ch. 6).

Collinearity. The first step in estimating the structural model is to test for collinearity. Table 6.38 shows that all indicators in the outer model have variance inflation factor scores below the critical

level of 5 and closer to the preferred level of 3. S3 was previously removed from the model because it exceeded the variance inflation factor critical benchmark in initial testing. Table 6.39 shows that all latent variable relationships in the inner model also have variance inflation factor scores below the critical level of 5 and closer to the preferred level of 3. The structural model therefore meets all benchmarks and can be said to be free from collinearity.

Table 6.33: Outer model (indicator) collinearity test

Indicator	Variance inflation factor	Indicator	Variance inflation factor
A1	3.637	E2	1.868
A2	3.003	E3	1.631
A3	3.307	H1	2.962
BL1	2.818	H2	3.406
BL2	2.900	H3	3.253
BL3	2.379	S1	3.203
BT1	1.396	S2	4.135
BT2	2.459	S4	3.499
BT3	2.891	SE1	2.146
BT4	2.490	SE2	2.897
E1	1.550	SE3	2.465

Table 6.34: Inner model (latent variable) collinearity test

	Variance inflation factor
Age -> Collaboration Frequency	1.094
Age -> Other Value	1.041
Age -> Self Value	1.041
Brand Love -> Other Value	1.739
Brand Love -> Self Value	1.739
Brand Trust -> Other Value	2.071
Brand Trust -> Self Value	2.071
Education -> Collaboration Frequency	1.024
Education -> Other Value	1.023
Education -> Self Value	1.023
Other Value -> Collaboration Frequency	1.855
Self-Efficacy -> Collaboration Frequency	1.232
Self-Efficacy -> Other Value	1.390
Self-Efficacy -> Self Value	1.390
Self-Value -> Collaboration Frequency	2.064

In-sample predictive power The in-sample predictive power of the model is measured by the coefficient of determination (R^2). In this case, Model 2 is predicting two outcomes. First, it is predicting the antecedent effect of relational factors (measured by brand trust and brand love), systems and processes (measured by consumer self-efficacy) and demographic context (measured by education and age) on consumer perceptions of self-orientated and other-orientated value in collaboration (stage 1 consumer collaboration motivation). The results show that the hypothesised antecedents explain 37% of the variance in self-orientated-value (R^2=0.370) and other-orientated value (R^2=0.366) (Table 6.40). Hair et al. (2019) explain that an R^2 result more than 0.25 and less than 0.50 can be considered moderate. Second, Model 2 is also predicting the antecedent effect of perceived self-orientated value, perceived other-orientated value, systems, and processes (measured by self-efficacy) and demographic context (measured by education and age) on consumer collaboration frequency (stage 2 consumer collaboration motivation). The results show that these hypothesised antecedents explain 19% of the variance in self-orientated value (R^2=0.191). Hair et al. (2019) explain that an R^2 result less than 0.25 can be considered weak. These results show that Model 2 has stronger predictive power for the first stage of collaboration than the second stage. The antecedents of perceived self-orientated and other-orientated value explain 37% of the variation in each dimension of value while the antecedents of collaboration frequency only explain roughly half that amount (19%).

Table 6. 35: In-sample predictive power (R^2)

	Original sample (O)	Sample mean (M)	P values
Collaboration frequency	0.191	0.203	0.000
Other Value	0.366	0.377	0.000
Self Value	0.370	0.383	0.000

Out of sample predictive power. In a model containing multiple endogenous variables, Hair et al. (2021 ch. 6) suggest that researchers need to select a key target construct before beginning the analysis of out of sample predictive power. In this case, the key target construct is the coefficient of determination (collaboration frequency) which has a positive Q^2 statistic and PLS-SEM root mean square error (RMSE) and mean absolute error (MAE) scores below linear regression model (LM) benchmarks. The two other endogenous variables in Model 2 have positive Q^2 statistics at the indicator and latent variable level.

Significance and relevance of latent variables. The significance and relevance of the latent variables' effects can be seen in Table 6.41. Self-Value -> Collaboration Frequency ($p<0.05$, $\beta=0.159$) and Other Value -> Collaboration Frequency ($p<0.1$, $\beta=0.138$) are both significant which supports their inclusion in the extended framework. However, self-orientated value has a more significant effect and is more relevant to collaboration frequency than other-orientated value suggesting some differentiation in the role of value types in motivating consumers to collaborate in last mile logistics.

The four relational antecedents of perceived value tested in Model 2, of Brand Trust -> Self Value ($p<0.05$, $\beta=0.198$), Brand Trust -> Other Value ($p<0.001$, $\beta=0.279$), Brand Love -> Self Value ($p<0.001$, $\beta=0.337$), and Brand Love -> Other Value ($p<0.001$, $\beta=0.379$), are all significant which supports their inclusion in the extended framework. This shows that while Model 1 demonstrates that relational factors are not significant antecedent influences on collaboration frequency (stage 2 consumer collaboration motivation), they do have an antecedent effect in creating perceptions of value in collaboration for consumers (stage 1 consumer collaboration motivation). Furthermore, the effects of the relational antecedents on perceptions of value are differentiated. They are stronger on perceptions of other-orientated value than for self-orientated value. The results also show that brand love has a stronger influence on perceptions of value in collaboration than brand trust. This result is perhaps unsurprising but contrasts with the insignificant effect of brand love on collaboration frequency found in Model 1.

Self-Efficacy -> Collaboration Frequency ($p<0.1$, $\beta=0.100$), Self-Efficacy -> Self Value ($p<0.05$, $\beta=0.173$) and Self-Efficacy -> Other Value ($p<0.05$, $\beta=-0.136$) are all significant supporting their inclusion in the extended framework. These results show that the perceived ability of consumers to successfully interact with retailer systems and processes has a dual role in fostering collaboration. It is both an antecedent of their perceived value in collaboration and of their motivation to frequently collaborate. Interestingly, the relevance of self-efficacy to self-orientated value is positive but negative for other-orientated value. This is evidence of a differential response to value type by this group of customers but needs further investigation to be satisfactorily interpreted.

The two demographic factors tested in Model 2, education, and age, have a significant antecedent influence on both perceived value (stage 1 consumer collaboration motivation) and collaboration frequency (stage 2 consumer collaboration motivation) supporting their inclusion in the extended framework. The four hypothesised antecedent effects on perceived value of Education -> Self Value ($p<0.05$, $\beta=0.101$), Education -> Other Value ($p<0.001$, $\beta=0.149$), Age -> Self Value

(p<0.001, β=-0.157) and Age -> Other Value (p<0.001, β=-0.222) are all significant and show that more educated and younger customers are likely to perceive value in collaboration and that other-orientated value is more important to them than self-orientated value. Their proposed antecedent effects on collaboration frequency, Education -> Collaboration Frequency (p<0.001, β=0.231) and Age -> Collaboration Frequency (p<0.05, β=-0.105), were both significant and suggest that demographic context influences regular collaboration in last mile logistics and that regular collaborators are likely to be more educated and younger than average.

Table 6.36: Significance and relevance of structural model relationships

		Path Coefficient	T statistics	P values	95% confidence intervals		Supported
H1a	Self Value -> Collaboration frequency	0.159	2.251	0.024**	0.162	0.071	Yes
H1b	Other Value -> Collaboration frequency	0.138	1.892	0.058*	0.137	0.073	Yes
H2a	Brand Trust -> Self Value	0.198	3.041	0.002**	0.201	0.065	Yes
H2b	Brand Trust -> Other Value	0.279	4.602	0.000***	0.282	0.061	Yes
H2c	Brand Love -> Self Value	0.337	5.440	0.000***	0.337	0.062	Yes
H2d	Brand Love -> Other Value	0.379	6.085	0.000***	0.379	0.062	Yes
H3a	Self-Efficacy -> Self Value	0.173	2.999	0.003**	0.172	0.058	Yes
H3b	Self-Efficacy -> Other Value	-0.136	2.645	0.008**	-0.137	0.051	Yes
H3c	Self-Efficacy -> Collaboration frequency	0.100	1.769	0.077*	0.099	0.057	Yes
H4a	Education -> Self Value	0.101	2.346	0.019**	0.101	0.043	Yes
H4b	Education -> Other Value	0.149	3.595	0.000***	0.149	0.041	Yes
H4c	Education -> Collaboration Frequency	0.231	4.723	0.000***	0.232	0.049	Yes
H4d	Age -> Self Value	-0.157	3.645	0.000***	-0.158	0.043	Yes
H4e	Age -> Other Value	-0.222	4.949	0.000***	-0.222	0.045	Yes
H4f	Age -> Collaboration Frequency	-0.105	2.126	0.034**	-0.105	0.049	Yes

Note: *p<0.1, ** p<0.05, ***p<0.01

Quadratic effects. The analysis of quadratic effects revealed that the relationship between perceived value and collaboration frequency is different in model 2 compared to model 1. The effect of self-orientated value on collaboration frequency is non-significant (p>.20) suggesting the effects are adequately explained by a linear relationship. However, a marginal quadratic effect was observed for other-oriented value on collaboration frequency (p < .10), indicating potential non-linear dynamics between the pursuit of altruistic and social value and the likelihood of becoming a frequent collaborator.

Elsewhere, model 2 provided mixed evidence of other curvilinear relationships at stage 1 and stage 2 of collaboration. Among the demographic variables, age demonstrated a significant quadratic effect on collaboration frequency (p = <.01, β = –0.085) and on other-oriented value (p = <0.05 , β = –0.061). These findings suggest that the influence of age is non-linear, with collaboration

frequency and perceptions of other-oriented value increasing up to a point before declining at higher levels of age. However, the quadratic effect of age on self-oriented value was not significant ($p>0.2$).

Brand constructs also displayed some evidence of curvilinearity. Brand trust exerted a significant quadratic effect on both other-oriented value ($p < .001$, $\beta = 0.272$) and self-oriented value $p = <0.05$, $\beta = 0.162$). This indicates that higher levels of trust initially strengthen perceptions of value, but the marginal effect diminishes at extreme levels, consistent with an inverted U-shaped pattern. In contrast, quadratic terms for brand love and education did not reach statistical significance across outcomes ($p > .20$), suggesting their effects are adequately captured by linear relationships.

To assess the practical relevance of these findings, effect size (f^2) statistics were examined. All of the significant quadratic effects were associated with small effect sizes according to Cohen's (1992) thresholds ($f^2 = .02$ = small; .15 = medium; .35 = large). For example, the quadratic effect of age on collaboration frequency yielded $f^2 = 0.018$, and age on other-oriented value yielded $f^2 = 0.015$, both of which fall within the small range. Similarly, the quadratic effect of brand trust on other-oriented value produced $f^2 = 0.059$ and on self-oriented value $f^2 = 0.035$, again suggesting small influence.

6.3.3 Results

We specified and tested Model 2 to answer three questions that arose from our testing of Model 1 informed by insights from the B2B and B2C collaboration literature and practice: (1) What is the antecedent influence of different types of perceived value on consumer motivation to collaborate in last mile logistics? (2) Can consumer motivation to collaborate in last mile logistics be conceived as a two-stage process as opposed to the single-stage process observed in the B2B collaboration literature? and (3) Are demographic factors contextual antecedents of the proposed first and second stage of consumer motivation to collaborate in last mile logistics? Our testing of Model 2 allows us to answer those questions as follows.

The results show that consumers do appear to be motivated by different types of value when they collaborate with retailers in last mile logistics. The relationships between Self Value -> Collaboration Frequency ($p<0.05$, $\beta=0.159$) and Other Value -> Collaboration Frequency ($p<0.1$, $\beta=0.138$) are both significant. This differs from the value derived from B2B collaboration which, as we found in the literature review, is solely economic (Chapter 2). Second, the results show that consumer collaboration can be conceived as a two-stage process. In the first stage, consumers try

collaboration and perceive self-orientated and other-orientated value in it. In the second stage, they are motivated to become regular collaborators. This demonstrates another difference between B2C collaboration and B2B collaboration which was found to be a single-stage process in the literature review (Chapter 2). Third, the results show that demographic influences do appear to influence both the first and second stages of consumer motivation to collaborate. The two demographic influences tested, age and education, have significant effects on both perceptions of value in collaboration and collaboration frequency (see Table 6.41). These results demonstrate that younger and more educated customers are more likely to perceive value in collaboration and to go on to become regular collaborators.

Model 2 provides a better understanding of the antecedent influences on consumer motivation to collaborate with retailers in last mile logistics than Model 1 in a number of ways. First, it provides stronger predictive power. Three endogenous variables are predicted in Model 2 versus a single variable in Model 1 and the range of their R^2 is from 0.192 to 0.370 as opposed to the single R^2 prediction of 0.129 in Model 1. Second, it provides greater insight into the motivation of consumers to collaborate and the differences between their motivation and that of businesses. It shows that consumer collaboration in last mile logistics is a two-stage process, which does not necessarily lead to a commitment to collaboration. It shows that the same antecedents that influence B2B collaboration influence B2C collaboration but that their influence varies over the two stages. Third, it provides more actionable insights for retailers by identifying the types of perceived value in collaboration that are most important to consumers at both stages of the process, identifying demographic groups that are most likely to become collaborators and demonstrating the differences in influencing perceived value in collaboration versus regular collaboration.

6.4 Interpreting the significance of the results

As well as answering our three research questions the results provide additional insights into the influence of the variables on motivation to collaborate at the first and second stages. The following section interprets the results.

6.4.1 The influence of value

Perceived self-orientated and other-orientated value are central to motivating consumers to collaborate in last mile logistics. This aligns Model 2 with social exchange theory which explains that actors in a network are motivated to act by the expectation of rewards (Emerson, 1976;

Thibault & Kelley, 1959). Perceptions of value are initially influenced by consumers' relationship with the brand (as measured by brand trust and brand love), their perceived self-efficacy in navigating retailer systems and processes, and their age and education levels. Perceived self-orientated and other-orientated value then have a significant influence on motivating regular collaboration. The effects of self-orientated value (economic and hedonic) on collaboration frequency are slightly stronger and more significant ($p<0.05$, $\beta=0.159$) than those of other-orientated value ($p<0.1$, $\beta=0.138$). This suggests regular collaboration is influenced more by efficiency and fun than by social status or doing good but that both are important.

6.4.2 The influence of relationships

The influence of relationships in forming perceptions of value from collaboration was shown to be significant and moderately strong. Both brand trust and brand love had a significant antecedent influence on self-orientated and other-orientated value. This was the effect we initially hypothesised that relationships would have on motivation to collaborate (H2) but was shown to be insignificant in our testing of Model 1.

One of the most interesting aspects of the results is the differential effects that can be observed. First, the coefficients for the relationship of brand trust with self-orientated value and other-orientated value ($\beta=0.198$ and $\beta=0.279$) are lower than those for brand love ($\beta=0.337$ and $\beta=0.379$). This suggests that a higher-level relationship with a retail brand influences stronger perceptions of value in collaboration. Second, the coefficients measuring the relevance of brand trust and brand love to other-orientated value ($\beta=0.279$ and $\beta=0.379$) are both higher than for their relevance to self-orientated value ($\beta=0.198$ and $\beta=0.337$). This is an indication that brand relationships influence perceptions of other-orientated value (social and altruistic) more than self-orientated value (economic and hedonic). Third, while our testing of Model 2 demonstrates the relevance of brand relationships in forming perceptions of value in collaboration our testing of Model 1 showed they have no such role in motivating regular collaboration. This suggests that the influence of a consumer's brand relationship in fostering collaboration is limited. Brand relationships are strongly associated with forming perceptions of value in collaboration but do not significantly influence a consumer's transition to becoming a regular collaborator.

6.4.3 The influence of systems and processes

Consumer perceived self-efficacy in navigating retailer systems and processes is shown to be an antecedent influence on their motivation to become a regular collaborator ($p<0.1$, $\beta=0.100$). These

effects are slightly less significant and less relevant than those observed in the testing of Model 1 ($p<0.05$, $\beta=0.107$). This can be explained by the greater number of variables tested in Model 2. The relevance of self-efficacy to collaboration frequency is the weakest of those tested in Model 2 suggesting its importance should not be overestimated. Self-efficacy has somewhat stronger effects on forming perceptions of value although these effects are mixed. Self-efficacy's influence on perceptions of self-orientated value is positive ($\beta=0.173$) but its influence on perceptions of other-orientated value is negative ($\beta=-0.136$). This result perhaps suggests that consumers with high self-efficacy are also highly self-orientated and accordingly not concerned with the judgement of others or taking actions that may benefit others. Further examination of the psychology literature may provide some insights in this regard.

6.4.4 The influence of context

Two demographic contextual influences, age and education, were introduced to Model 2 and their antecedent effects on forming perceptions of value and motivation to collaborate were shown to be significant. Once again differential effects can be observed. First, the coefficients for the influence of education on self-orientated value and other-orientated value ($\beta=0.101$ and $\beta=0.149$) are both positive while the coefficients for age ($\beta=-0.157$ and $\beta=-0.222$) are stronger but negative. This suggests that more educated and younger consumers perceive value in collaboration but also that the effects of age are more important. Second, the coefficients associated with education and age's association with other-orientated value ($\beta=0.149$ and $\beta=-0.222$) are both higher than for their association with self-orientated value ($\beta=0.101$ and $\beta=-0.157$). This is an indication that these demographic groups form stronger perceptions of other-orientated value (social and altruistic) in collaboration than self-orientated value (economic and hedonic). This is similar to the effect observed with our brand relationship variables. It suggests that while self-orientated value has a stronger antecedent influence on motivating consumers to collaborate regularly, other-orientated value is more important in influencing perceptions of value in collaboration. Third, the differential effects of age and education can also be observed in stage 2 of motivation to collaborate. The coefficient for education's influence on collaboration frequency ($\beta=0.231$) is positive and higher than the coefficient for age ($\beta=-0.105$). This suggests that while age may be a stronger influence at the first stage of motivation to collaborate it is more educated customers who are more likely to become regular collaborators.

6.4.5 Efficacy of Model 2

The results of our analysis show that Model 2 provides a superior explanation of consumer motivation to collaborate in last mile logistics when compared to Model 1. Model 2 provides superior predictive power, shows that consumer collaboration motivation can be conceived as a two-stage process with differential antecedent influences at each stage, and provides more actionable insights for practitioners hoping to influence more consumers to collaborate. However, Model 2 was tested with secondary data and further research is required using primary data to validate our proposed revised and extended framework.

Chapter 7 : Discussion and Conclusion

7.1 Introduction

The growth of online shopping has significantly elevated the role of consumers as essential supply chain collaborators. The purpose of this study was to determine the motivation of consumers to collaborate with retailers in last mile logistics. Many theories and conceptual frameworks have been used, primarily in the marketing literature, to explain consumers' motivation to cocreate with retailers in various initiatives. However, well-established supply chain collaboration theories have not been tested in this domain. This study explored the extent to which the existing knowledge and frameworks in the SCC literature, supplemented by insights from the consumer cocreation literature, can be deployed to explain the emerging motivation of consumers to collaborate with retailers in last mile logistics. To address this problem, an extensive literature review of the antecedent motivators of SCC was conducted supplemented by selected articles from the consumer cocreation literature. This resulted in the development of a generic framework of consumer motivation to collaborate in the supply chain (Model 1) and three hypotheses for empirical testing.

Model 1 was tested using PLS-SEM and data gathered from 374 Australian consumers who actively collaborate in last mile logistics. The results showed that that Model 1 only partially explains consumer motivation to collaborate with retailers in last mile logistics. Perceived value (H1) and the perceived ability of consumers to successfully interact with retailer systems and processes, demonstrated by their self-efficacy (H3), were shown to be significant antecedent influences on motivation to collaborate yet, somewhat surprisingly, the influence of consumer relationships with retailers, measured by brand trust and brand love, was found to be insignificant. Furthermore, the combined antecedent influence of perceived value and self-efficacy on motivation to collaborate, albeit significant, was weak suggesting that either other influences not included in the initial model, or a different interplay of the factors considered that better suits motivation and behaviour, needed to be identified and tested.

After analysing the results from Model 1, an extended framework was proposed and tested (Model 2) using the data collected to test Model 1. Model 2 conceives consumer motivation to collaborate

as a two-stage process with variable influences at each stage. In the first stage, consumers perceive value in collaboration influenced by their brand relationships, their perceived ability to successfully interact with retailer systems and processes (measured by self-efficacy), and demographic context (measured by age and education). In the second stage, consumers are motivated to become regular collaborators influenced by perceived value in collaboration, their self-efficacy and demographic context. The influence of these factors varies between the two stages.

This study extends the SCC literature by examining collaboration in a B2C context, specifically focusing on consumer participation in last mile logistics. It contributes to theory by highlighting key differences between the drivers of B2B and B2C collaboration. Notably, the findings reveal that: (1) consumer motivation to collaborate follows a two-stage process, in contrast to the typically single-stage model observed in B2B settings; and (2) while many of the same factors influence collaboration in both contexts, their relevance and impact differ across the stages of consumer decision-making. The study also offers practical contributions by identifying actionable implications for retailers seeking to foster consumer collaboration and for public policy makers keen to mitigate the environmental impacts caused by the growth in home delivery. These recommendations are based on the insight that consumer motivations differ fundamentally from those of business partners and, as such, require distinct strategies for effective engagement and management.

The following sections summarise the findings from the testing of Models 1 and 2. The descriptive analysis that was conducted to provide context to the testing of the two models is also discussed.

7.1.1 Influence of value

We find that perceived value is central to the motivation of consumers to collaborate with retailers in last mile logistics. This aligns our study with social exchange theory which explains that actors in a network are motivated to act by the expectation of rewards (Emerson, 1976; Thibault & Kelley, 1959). It also aligns our study with numerous studies in the B2B and B2C literature that associate perceived value with motivation to collaborate (e.g., Mora-Monge et al., 2019; Panahifar et al., 2018; Roberts et al., 2014; Zare et al., 2018).

The four measures of value (economic, hedonic, social, and altruistic) were taken from the Holbrook typology (2006). Economic value refers to the utilitarian or functional benefits associated with cost-effectiveness and performance. In a last mile logistics context this refers to consumers' assessment of the practical worth derived from collaboration such as time saving or

delivery certainty. Hedonic value refers to the experiential and emotional benefits gained from engaging with a product or service. Hedonic value may be generated if consumers gain pleasure, excitement, or fun from their collaboration. Social value refers to the benefit of enhanced esteem consumers receive from a consumption experience. In last mile logistics this refers to the recognition consumers may gain from their social network as a result of their collaboration. Altruistic value refers to the satisfaction gained from providing a benefit to others. In last mile logistics this refers to the ethical or environmental benefits such as reduced emissions or packaging that may accrue as a result of collaboration.

The descriptive analysis (Appendix F) established a preliminary link between perceptions of value and collaboration frequency. The survey was designed such that a set of 14 attitudinal indicators were used to measure consumers' attitudes to value in collaboration on a 5-point scale using the four value dimensions (economic, hedonic, social and altruistic) from the Holbrook typology (Holbrook, 2006). First we analysed how many of the value indicators were significantly above the mid-point of a 5-point scale (Figure AF2). The results showed that that consumers perceive the value derived from collaboration in last mile logistics to be positive. The positive perception is observed across multiple dimensions of value. This contrasts with B2B collaborations observed in the SCC literature which are driven primarily by economic values. Economic value is, however, the most important dimension for consumers too, as reflected in highest average indicator scores and lowest average standard deviations.

Next, net promoter score (Reichheld, 2003) was used to explore the relationship between collaboration frequency and value perception. First, the overall relationship between the dimensions of value and consumer collaboration was examined. The results (Table AF3) again showed that economic value is the most important to collaborating consumers followed by hedonic value and altruistic value. The influence of social value was negative. These results suggest that the practical benefits derived from collaboration, like time saving and delivery certainty, are the most important to collaborating consumers, but that value derived from the experience of collaborating and the potential benefits to the environment are also important.

The second step was to use cross tabulation of the net promoter scores with collaboration frequency to explore the relationship between value perception and collaboration frequency. The results (TableAF4, and Figure AF3) showed that perceptions of value are strongest among consumers with the highest collaboration frequency and generally decline as collaboration frequency declines. In addition, the types of value derived change with frequency of collaboration.

Economic value has the strongest net positive scores across all levels of collaboration frequency. Hedonic value also has net positive scores across all levels of collaboration frequency, but they are lower. Perceptions of social and altruistic value from collaboration turn net negative when collaboration frequency is less than once per month. This demonstrates that all dimensions of value are important to the most frequent collaborators while only the practical and experiential benefits of collaboration are important to less frequent collaborators.

Testing of the structural model (Model 1) showed that the influence of perceived value on collaboration frequency was statistically valid. **H1**, that perceived value is an antecedent of consumer motivation to collaborate with retailers in last mile logistics, was supported indicating that for consumers, perceived value is the principal antecedent of their motivation to collaborate in last mile logistics. This finding aligns the motivation of consumers with those of businesses to collaborate in the supply chain. However, the types of value perceived in collaboration by consumers differ from those observed in the B2B literature. Economic, hedonic, social and altruistic value were found to be valid and reliable reflective measures of perceived value while the B2B literature only associates perceived economic value with motivation to collaborate (e.g., Afshan et al., 2018; Wu & Chiu, 2018).

Testing of the extended and revised model (Model 2) provided further insights into the influence of value. Model 2 tested the relative influence of self-orientated value (economic and hedonic), and other-orientated value (social and altruistic). The effects of self-orientated value on collaboration frequency were found to be slightly stronger and more significant than those of other-orientated value. This suggests regular collaboration is influenced more by efficiency and fun than by social status or doing good. The results also show that antecedents of consumer perceptions of self-orientated and other-orientated value in collaboration are the relationship with the brand (as measured by brand trust and brand love), perceived self-efficacy in navigating retailer systems and processes as well as consumer age and education levels. Brand relationships and consumer age and education are more relevant to forming perceptions of other-orientated value while perceived self-efficacy is more relevant to forming perceptions of self-orientated value. This demonstrates that consumers first form perceptions of value in collaboration then are motivated to become regular collaborators highlighting that consumer collaboration involves both value recognition and behavioural intent.

7.1.2 Influence of relationships

The influence of consumer relationships with retail brands on consumer motivation to collaborate, measured by brand trust and brand love, was tested in Model 1 and Model 2. In Model 1 the influence of relationships on collaboration frequency was tested but, surprisingly, the effects of both brand trust and brand love were insignificant. It was expected, based on social exchange theory and our review of the literature, that consumers would be more motivated to collaborate with retail brands they trust and are committed to. For example, in the B2B literature, Wu et al. (2014) used social exchange theory to test the effect of relational factors (trust, commitment, reciprocity and power) on information sharing and SCC, finding positive and significant effects in both cases. Similarly, in the B2C literature, Wallace, Torres et al. (2021) found that consumers who trust a brand are more willing to cocreate value with it and that these effects are enhanced when the brand is loved. Our results therefore do not align with the reviewed B2B and B2C studies. They suggest brand relationships are an insignificant influence in motivating consumers to collaborate frequently once perceptions of value in collaboration have been formed.

Model 2 tested the antecedent effect of relationships on forming perceptions of value in collaboration. The results show that both brand trust and brand love have a significant antecedent influence on forming perceptions of self-orientated and other-orientated value in collaboration. Differential effects were observed in the results. First, brand trust's relevance to forming perceptions of self-orientated value and other-orientated value is lower than that of brand love. This suggests, unsurprisingly, that a higher-level relationship with a retail brand influences stronger perceptions of value in collaboration. Second, the relevance of brand trust and brand love to other-orientated value is higher than their relevance to other-orientated value. This is an indication that brand relationships influence perceptions of other-orientated value (social and altruistic) in collaboration more than self-orientated value (economic and hedonic). The results of Model 1 and Model 2 when considered together present a dichotomy. They show that consumer brand relationships are strongly associated with forming perceptions of value in last mile logistics collaboration but do not significantly influence their transition to becoming a regular collaborator.

7.1.3 Influence of systems and processes

Systems and processes facilitate the flow of information between actors in the supply chain which in turn facilitates collaboration. In B2B collaboration this requires investments in compatible systems, and the development processes to manage issues such as what information can be shared and under what circumstances. In B2C collaboration consumers have no such obligations and

generally only require a smartphone and an ability to confidently navigate the systems and processes retailers provide to facilitate collaboration. In our frameworks we therefore tested the perceived ability of consumers to successfully interact with retailer systems and processes, demonstrated by their self-efficacy.

Model 1 tested the direct influence of self-efficacy on motivation to collaborate as measured by collaboration frequency. The results show that the self-efficacy has a significant influence on motivation to collaborate but that its relevance is weak. However, this result is broadly comparable ($\beta<0.2$) with the effects of some of the elements of systems and processes reported in the SCC literature. For example, Lee et al. (2010) measured the effect of information quality on operational and strategic collaboration and reported significant but weak effects while Richey et al. (2012) measured the influence of technology complementarity on collaboration and reported a similarly significant but weak effect.

Model 2 tested the influence of self-efficacy on forming perceptions of value in collaboration as well as re-testing its influence on collaboration frequency in the context of an extended framework. The relevance of self-efficacy to collaboration frequency is the weakest of the variables tested in Model 2 suggesting its importance should not be overestimated. Self-efficacy has significant and somewhat stronger effects on forming perceptions of value although these effects are mixed. Self-efficacy's influence on forming perceptions of self-orientated value in collaboration is positive ($\beta=0.173$) but its influence on perceptions of other-orientated value is negative ($\beta=-0.136$). This result perhaps suggests that consumers with high self-efficacy are also highly self-orientated and accordingly not concerned with the judgement of others or taking actions that may benefit others.

7.1.4 Influence of context

Context is shown to be an important influence on collaboration in both the B2B and B2C literature. In the B2B literature contextual factors such as firm size, industry type, uncertainty and culture have been shown to be significant (e.g., Mora-Monge et al., 2019; Srivastava et al., 2015; Zhang & Cao, 2018) while in the consumer cocreation literature, demographics, personality, industry, risk and culture have been shown to be significant (e.g., Chatterjee et al., 2023; Grott et al., 2019; Mainardes et al., 2017; Zare et al., 2018). The design of Model 1 excluded any contextual factors as the intention was to test a generic model of supply chain collaboration in the B2C context of last mile logistics. This meant our collection of contextual data through the survey was limited to basic demographic information. However, demographic context, as measured by age

and education, was tested in Model 2 and the descriptive analysis explored the influence of consumer domicile.

The influence of consumer domicile (Appendix AF3) on collaboration frequency was assessed using the postcode provided by respondents. It was assumed that the infrastructure to support consumer collaboration (click and collect, parcel lockers, and location aware delivery apps) is more likely to exist close to a state capital CBD. We found that respondents living within a 20 km and 30 km radius of a state capital were twice as likely to collaborate more than once per week while respondents living within a 40 km radius of a state capital CBD (effectively within the state capital metropolitan area boundary) were three times more likely to collaborate once per week. This analysis is in line with previous studies that tested consumer intention to choose pick up rather than home delivery (e.g., Collins, 2015; Merkert et al., 2022). However, it is very rudimentary and relies on some strong assumptions and therefore was not considered robust enough for further testing.

Model 2 tested the influence of two demographic contextual variables, age and education. Both were shown to have a significant influence on forming perceptions of value in collaboration and motivation to frequently collaborate. Differential effects were observed with age having a stronger influence on forming perceptions of value, and education having a stronger influence on motivation to collaborate. The relevance of education level to collaboration frequency was the highest of the five variables that measured it. This suggests something about more educated customers' lifestyles or their understanding of the benefits of collaboration causes them to collaborate more frequently.

The addition of the demographic variables of age and education as antecedents of consumer motivation to collaborate frequently improved the explanatory power of Model 2 compared to Model 1. However, the explanatory power of both models is weak suggesting further contextual variables as observed in the literature need to be investigated.

7.2 Research contributions

The continued growth in online shopping brings increasing cost and complexity for retailers in last mile logistics. Engaging consumers as active collaborators in the delivery process through click and collect, parcel lockers and location aware delivery apps can mitigate some of these challenges for retailers and improve delivery experience for consumers. Understanding the motivation of consumers to engage in collaboration is therefore important to improving the efficiency and

effectiveness of last mile logistics operations. SCC is well established in the retail industry, but the literature has so far only considered the B2B domain and has not addressed the consumer as a value generating collaborator. This study makes several important contributions to both academic literature and retail practice.

7.2.1 Contributions to academic literature

This study extends the SCC literature to the consumer domain. To the best of our knowledge, there are no studies in this literature with a prime focus on the motivation of the consumer as a value creating collaborator in the supply chain. This gap has been noted over the years, resulting in multiple calls for research on this topic (Lusch, 2011; Rouquet et al., 2017; Soosay & Hyland, 2015; Tokman & Beitelspacher, 2011), which have largely gone unanswered. In so doing, the study contributes to the emerging field of consumer logistics which aims to re-unite the disciplines of supply chain and marketing (Esper et al., 2020).

The major academic contribution of this study is to demonstrate that the motivation of consumers to collaborate in retailer supply chains can only partially be explained by existing frameworks and theories from the SCC literature. We identify consumer collaboration motivation as a two-stage process. In the first stage, consumers try collaboration and perceive value in it; in the second stage, they decide whether to become regular collaborators highlighting that consumer collaboration involves both value recognition and behavioural intent. Furthermore, our findings reveal that trying collaboration and perceiving value in it does not necessarily lead to regular engagement. The SCC literature often describes a sequential progression from trust to commitment to information sharing (e.g., Panahifar et al., 2018; Tsanos & Zografos, 2016), but it does not conceptualise collaboration as a two-stage process that can begin with trial. Our findings fill this theoretical gap.

The second contribution involves identifying the varying levels of influence that different antecedents of motivation have at each stage of the collaboration process. Based on our literature review (Chapter 2), we identified four key antecedents of motivation: perceived value, relationships, systems and processes, and context. Model 1 tested three of these motivators. Our testing showed that consumer motivation to collaborate with retailers in last mile logistics can be partially explained by perceived value (H1) and the perceived ability of consumers to successfully interact with retailer systems and processes, demonstrated by consumers' self-efficacy (H3). The influence of consumer relationships with retailers, measured by brand trust and brand love (H2), was found to be insignificant. Furthermore, the combined influence of perceived value and self-efficacy on motivation to collaborate, albeit significant, was weak.

The extended framework (Model 2) tested the forming of perceptions of value in collaboration. Findings show that consumers are influenced by relationships (measured by brand trust and brand love), self-efficacy and demographic context. Variable effects can be observed such that relationships and demographic context influence perceptions of other-orientated value more than self-orientated value while self-efficacy influences self-orientated value more than other-orientated value. Furthermore, the combined antecedent influence of the variables at the first stage of consumer motivation to collaborate (perceived value in collaboration) is almost double that of the variables at the second stage (motivation to become a regular collaborator). This demonstrates that these antecedent motivators are more predictive of initial engagement than of regular collaboration.

7.2.2 Practical and managerial implications

The results from both models demonstrate that the motivation of consumers to collaborate in the supply chain differs significantly from the motivation of businesses to collaborate. Insights from over 35 years of SCC research in B2B contexts do not fully translate to explain different aspects of B2C collaboration and therefore require a different management approach.

H1 was supported showing that, like businesses, consumers are primarily motivated to collaborate by perceived value. However, for consumers, perceived value extends beyond practical economic benefits, to self-orientated value (economic + hedonic) and other-orientated value (social + altruistic). This challenges the prevailing dominant focus of the industry on speed and cost reduction in last mile logistics. Retailers should therefore broaden their value propositions to highlight additional dimensions of value, such as enjoyment and environmental benefits, when designing collaborative initiatives and services. The curvilinear nature of the relationship between perceived value and collaboration frequency indicates that value perceptions increase rapidly with engagement, suggesting that promotional efforts should focus on encouraging initial trial.

The rejection of H2 indicates that consumer relationships with a retail brand do not directly influence their motivation to collaborate frequently in last mile logistics. However, the testing of Model 2 shows that brand relationships (brand trust and brand love) positively influence perceptions of value in collaboration. Retailers should therefore target known high frequency customers or loyalty program members known to have a strong relationship with the brand for trial campaigns. These campaigns should emphasise other-orientated value (social and altruistic) available from collaboration as this was shown to be more relevant to them than self-orientated value (economic and hedonic). This may mean developing messaging related to environmental

benefits like less packaging and fewer delivery trucks on the road (altruistic value), or the high regard your neighbours and friends will hold you in for making the choice to collaborate (social value).

H3 was supported, albeit quite weakly, showing that retailers need to make the processes associated with collaboration in last mile logistics as simple as possible to encourage collaboration frequency. Model 2 further suggests that consumers' perceived ability to navigate retailer systems and processes (measured by self-efficacy) has a significant influence on forming perceptions of self-orientated value in collaboration. Although prior studies have demonstrated the importance of ease of use in consumer adoption of collaborative logistics services (e.g., An et al., 2022; Lemke et al., 2016), we are not aware of any attempt to identify what ease of use means to consumers. Retailers will need to conduct research in their own target markets to determine what ease of use means to their customers.

The addition of demographic variables to Model 2 indicates that retailers should target more educated and younger customers as potential collaborators. These groups are more likely to both perceive value in collaboration (stage 1) and to become regular collaborators (stage 2). Once again, these campaigns should emphasise the social and environmental benefits as other-orientated value (social and altruistic) was shown to be more relevant than self-orientated value (economic and hedonic) to both these groups. Among them, educated consumers show the highest likelihood of regular collaboration and may be especially valuable. The reasons why more educated customers are more likely to perceive value and become regular collaborators may be related to their professional lifestyles or perhaps they are more "savvy" to the benefits of collaboration. Further research is required to test these propositions.

Finally, the evidence that consumer collaboration is a two-stage process suggests that, in addition to encouraging trial, retailers should develop marketing strategies to turn casual consumer collaborators into regular collaborators in last mile logistics. These strategies could include offering discounts based on number of collaborative deliveries received in a month following the example of location aware food delivery apps such as Deliveroo and Uber Eats or providing VIP parking for regular pick-up customers following the example of retailers like Walmart, Best Buy and Home Depot in the US. It is also likely that speed and efficiency at the pick-up point may be an effective non-financial incentive for customers to become frequent collaborators (Wassel, 2020).

The findings also have implications for public policy makers and non-government organisations (NGOs). The continued growth of home delivery has various consequences such as increased road

congestion, the safety of delivery drivers, increased emissions, and the need to dispose an increasing amount of packaging. Policy makers and NGOs seek to mitigate these effects. Previous studies have attempted to re-model delivery networks to include environmentally sensitive options such a pick up points (e.g., Masteguim & Cunha, 2022). This study contributes by demonstrating to policy makers and NGOs the consumer behaviour that will motivate participation in collaborative networks should they be deployed.

7.3 Limitations and future research directions

7.3.1 Limitations

This study has several limitations. Some of these relate to the method chosen and others to the generic design of Model 1.

A limitation of the survey method is that it relies on a population sample. In this survey, as in all others, it is possible that non-respondents could have held valuable insights into the research question. This is known as non-response bias (Bryman & Bell, 2015 ch.8). The research sample was limited by design to the Australian retail context and to consumers who had received an online order via click and collect, parcel locker or a location aware delivery app in the last 60 days. This design excluded respondents from other geographies and those who had not collaborated in delivery. The inclusion of multiple geographical markets in survey samples has been adopted by other studies investigating the antecedents of SCC and consumer cocreation (Bettiga et al., 2017; Chatha et al., 2023).

Another limitation of the survey method is that it relies on the respondents to provide accurate answers to questions. Failure to provide accurate answers can be the result of issues with the survey such as poor question wording, or attributes of the respondents and is known as measurement bias (Stern et al., 2014). Despite efforts to test questions and remove unsatisfactory responses from analysis researchers cannot know whether respondents have actually had the experience they claim to have had in their survey responses. In addition, all surveys involving panel members are potentially biased by the financial incentives offered to participants.

The survey method also limits the depth of insights that can be gained from a study. Like other quantitative methods, survey research applies a deductive approach to the research problem. Inductive approaches associated with qualitative research are designed to elicit insights as to why a phenomenon may be happening. Our study shows that a framework of antecedent motivations

of collaboration developed from the SCC literature only partially explains collaboration in a B2B context but is limited in explaining why this might be the case.

The study was also limited by the generic design of Model 1. The purpose of Model 1 was to test a generic model of collaboration motivation developed primarily from the SCC literature in the consumer context of last mile logistics. This meant the effects of different types of value and the influence of context were not tested. The design of Model 2 addressed some of these limitations by examining the effects of self-orientated and other-orientated value and by introducing two contextual variables (age and education) to the framework. However, Model 2 was limited to data collected to answer the research questions associated with Model 1. For example, our selection of variables to represent the different types of value that motivate consumers to collaborate in last mile logistics was limited to data collected to assess the overall influence of perceived value in Model 1. This data only allowed us to identify two dimensions of perceived value to include in Model 2 – self-orientated value and other-orientated value.

The design and testing of Model 2 was limited by the data used to test it. This data was based on survey responses designed to collect data to test another model (model 1). This meant some of the relationships between variables in the model could not be adequately tested. For example testing the relationship between contextual factors and value perceptions and collaboration frequency was limited to basic demographic data (age, gender, income, education, postcode) despite many other potential contextual influences on consumer collaborative behaviour being identified in the literature review in Chapter 2. These include personality type and product type (Zare et al., 2018), uncertainty and risk (Mainardes et al., 2017) and culture (Grott et al., 2019).

7.3.2 Future research directions

This is a pioneering study in the field of consumer collaboration in retailer supply chains. As such, many opportunities exist for further research. Some are derived from the limitations of the current study, and some are prompted by questions raised by the results. Below we describe several of those research opportunities.

- Future research may consider using a respondent sample drawn from other or multiple countries. The research sample for this study was limited by design to the Australian retail context. Australia is in many ways typical of a developed country. It has GDP per capita of approximately US$67,979, placing it among the top 15 globally (Australian Bureau of Statistics 2024). Online shopping is well established and represented 19% of all retail sales

in 2024 (Australia Post, 2025). However, in other respects Australia is not typical. It has an urbanised but low density and highly dispersed population and average broadband connection speeds rank 52nd out of 121 countries (Jackson, 2025). A comparative study of developed countries could isolate the influence of demography and infrastructure on motivation to collaborate. A comparative study including less developed countries could also compare the influence of GDP per capita and the incidence of online shopping. All of these would assist in increasing the generalisability of the findings.

- Future research may consider the motivations of non-collaborative online shoppers who exclusively receive orders via home delivery. The sample investigated in this study was limited to consumers who had received an online delivery by one of the nominated services in the last 60 days. Extending the sample in this way would provide richer insights about motivation to collaborate including understanding the gap between non-collaboration and perceiving value in collaboration, representing a potential third stage in the process of consumer motivation to collaborate.
- The collaborative channels examined in this thesis differ in the level of effort required by the consumer, the types of retailers offering them, and the geographic or market contexts in which they are available. Future research may consider comparing the motivation of consumers between collaborative modes (click and collect, parcel locker, location aware delivery app). Such research is likely to reveal contextual differences between motivation between modes building on the generic approach employed in this study. A comparative study of this sort is likely to be of great value to practitioners determining the mix of collaborative channels in which to engage consumers.
- One of the most interesting aspects of the results is the identification of two discrete stages in the process of motivating consumer collaboration in last mile logistics. In the first stage consumers perceive value in collaboration and in the second stage they become regular collaborators. The descriptive analysis infers that when certain thresholds of value perception are reached consumers become regular collaborators. However, this effect could be circular, and a limitation of PLS-SEM is that we are unable to measure the circular effect of collaboration frequency on perceived value in collaboration. Further research may consider comparing the behaviour of the most frequent collaborators with the least frequent collaborators to determine the statistical validity of the conclusions inferred by the descriptive results.
- The low predictive power of Model 1 and Model 2 suggests many more opportunities exist to identify additional influences on collaboration frequency not considered in this study.

For example, our consideration of the influence of perceived value was limited to the four dimensions of the Holbrook (2006) typology. Leroi-Werelds (2019) has suggested updates and extensions to the Holbrook typology containing extra dimensions of value that could be tested. This would allow a more precise assessment of the value dimensions that influence regular collaboration.

- This study showed that consumers perceived self-efficacy in their ability to navigate retailer systems and processes has a significant influence on both perceptions of value in collaboration and motivation to collaborate regularly. A number of research opportunities relate to this finding. An opportunity exists to further investigate what ease of use means to consumers. Previous studies have noted the influence of ease of use in consumer adoption of collaborative logistics services (e.g., An et al., 2022; Lemke et al., 2016) but we are not aware of any that attempt to define what ease of use means to consumers. Another promising related avenue for research is the role of new technologies in enhancing the tools that support consumers during the collaboration process. Füller and Bilgram (2017) identified tool support as a critical factor in shaping the cocreation experience. Investigating how developments in augmented reality and artificial intelligence influence tool support could provide new perspectives into consumer collaboration motivation.
- The influence of contextual factors on collaboration motivation was also not fully explored in this study. Two demographic influences, age and education, were tested in Model 2 but factors such as personality type and product type (Zare et al., 2018), uncertainty and risk (Mainardes et al., 2017) and culture (Grott et al., 2019), which have already been shown to influence consumer cocreation, were not. Similar contextual influences have been investigated in the B2B literature such as product type, uncertainty, risk, and culture (J. V. Chen et al., 2014; Myhr & Spekman, 2005; Srivastava et al., 2015; Zhang & Cao, 2018). The role of uncertainty and risk in influencing consumer collaboration would link consumer collaboration to transaction cost economics theory (Williamson, 1975, 2008) which has been extensively cited in the SCC literature to explain collaboration motivation. Situational context could also be explored whereby consumers choose home delivery in certain circumstances but collaborative methods in others.
- The education level of consumers was found to be the most important influence on collaboration frequency in Model 2. This finding warrants further investigation. It is not clear why more educated consumers are the most likely identifiable group of consumers to collaborate in last mile logistics frequently. It could be due to their busy professional lifestyles, their greater awareness of the benefits of collaboration or the areas in which they

live, but none of this was tested. Studying this group may also provide general insights into what influences consumer collaboration.

- Another contextual influence partially investigated in this research was customer domicile. However, this investigation was at a descriptive level, relied on some strong assumptions and was not statistically validated. Our assumption was that consumers living closer to a state capital CBD would have more access to the infrastructure supporting collaboration (click and collect services, parcel lockers and location aware delivery apps) and would therefore be more likely to collaborate. The results showed that consumers living within a 40 km radius of a state capital CBD were three times more likely to collaborate more than once per week. Consumer proximity to infrastructure has already been investigated in relation to choice of home delivery or pick up (e.g., Collins, 2015; Merkert et al., 2022) but it has not been investigated in relation to frequency of collaboration or other motivators identified in this study. Future research should use more granular data to investigate our assumption that collaborative infrastructure is more prevalent closer to state capital CBDs. For instance location-aware tracking apps may be more prevalent in remote areas with less precise mapping, and parcel lockers may be more common in rural or hard-to-reach locations. .Retailers rely heavily on trade area analysis in deciding where to locate stores (e.g., Jones & Simmons, 1990). Further research into the influence of proximity to infrastructure could provide guidance on optimising the geographical reach of collaborative services.
- An unexplored area in this study is the role of the processes of collaboration in motivating consumers to transition from perceiving value in collaboration to becoming regular collaborators. Customer satisfaction has been linked with cocreation in many studies (e.g., Carlson et al., 2019; Dong et al., 2016; Hollebeek & Rather, 2019; Hunt et al., 2012). Satisfaction with the process of collaboration may also influence consumers in transitioning from perceiving value in collaboration to becoming regular collaborators in last mile logistics. A study conducted during the COVID-19 pandemic found customers who waited less than two minutes to receive their order via click and collect were more than four times as likely to be return shoppers than customers kept waiting for 10 minutes or more (Wassel, 2020). Investigating the influence of process on motivation to collaborate would move the research into the domain of what Lee et al. (2010) described as the "activities" of SCC, referring to the processes necessary to maintain and enhance collaboration within established relationships. These processes have not been considered

in this research but could provide an interesting cross over point between the literature on the antecedents of consumer collaboration and literature on the processes that sustain it.

- The general benefits of SCC compared to traditional transactional relationships for businesses are well established in the literature (e.g., Grott et al., 2019; Panahifar et al., 2018). However, quantifying these benefits in the context of consumer collaboration remains unexplored. In last mile logistics, for instance, home delivery is recognised as a complex and costly endeavour for retailers (e.g., Cárdenas et al., 2017). Several commercial studies have highlighted the significant financial burden, strategic vulnerabilities, and customer dissatisfaction that can arise from reliance on home delivery services (Incisiv, 2021; Shipengine, 2024). Despite this, no study has yet provided a detailed analysis of the effects of transitioning customers from home delivery to collaborative modes of order fulfillment. Future research can quantify the costs, benefits, and impacts on customer satisfaction associated with such transitions. Addressing these gaps would not only advance the academic knowledge on consumer collaboration but also offer practitioners valuable insights to inform strategic decision-making in designing cost-effective, sustainable and customer-centric supply chain solutions.
- The generic framework of antecedents of consumer motivation to collaborate in the supply chain was tested in a last mile logistics context but consumer collaboration is also evident in other supply chain stages such as design, manufacturing and financing. In each case, collaboration can be observed in practice but has yet to be examined through the lens of SCC. Testing the generic framework developed for this study would highlight simlarities and differences between the motivations of consumers to collaborate and different supply chain stages.
- This study has provided some initial insights into the motivation of consumers to collaborate in retail supply chains in relation to established theories and frameworks from the SCC and consumer cocreation literature. However, like all quantitative studies we have provided insights into what may happen on average rather than insights on why it is happening. Qualitative analysis may provide further insights on why consumers are motivated to collaborate and provide concepts for testing in future quantitative studies.
- Finally, we offer a hypothesis for testing based on the results of Model 2 which we hope may be adopted in future research.

Consumer motivation to collaborate with retailers in last mile logistics is a two-stage process. In the first stage, consumers perceive self-orientated and other-orientated value

in collaboration influenced by their relationship with the brand (measured by brand trust and brand love), their perceived ability to navigate retailer systems and processes (measured by self-efficacy) and the demographic context of their collaboration (measured by age and education). In the second stage, consumers are motivated to become regular collaborators influenced by perceived self-orientated and other-orientated value in collaboration, their perceived ability to navigate retailer systems and processes (measured by self-efficacy) and the demographic context of their collaboration (measured by age and education).

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Appendices

The appendices provide additional information on the survey.

- Appendix A is the participant information sheet that was provided to potential participants.
- Appendix B is the participant consent form and the survey itself. The survey was conducted online so consent was also sought online. Respondents aged under 18 were screened out. The full survey instrument shows the order of the questions, and how type of collaboration and retailer collaborated with are incorporated in the questions and question (29) to screen out non-collaborators who passed initial screening.
- Appendix C provides screenshots of the layout of the survey instrument as it appeared to respondents on either their computer or mobile device.
- Appendix D is the ethics approval received from the University of Sydney for this research.
- Appendix E provides a descriptive analysis of the literature review including publication trends and theories used in the literature to explain collaboration.
- Appendix F provides descriptive analysis of the results of the survey which provides context for the analysis of the structural model.

Appendix A : Participant information sheet

Participant Information Statement
Research Study:
Consumer motivation to collaborate in last mile logistics.
Professor Ben Fahimnia | Professor and Chair of Decision Sciences
Institute of Transport and Logistics Studies **The University of Sydney Business School**
Room 434, Merewether Building (H04), The University of Sydney,| NSW | 2006 **T** +61 2 9114 1801 | F: +61 2 9114 1863 ben.fahimnia@sydney.edu.au | W: http://sydney.edu.au/business/itls/staff/behnamf

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1. What is this study about?

We are conducting a research study about online shopping and customer delivery choices. The study will identify what influences online shoppers to collaborate with firms in the logistics of receiving their orders. Taking part in this study is voluntary.

2. Who is running the study?

This study is conducted by the following researchers:

- Ben Fahimnia, Professor and Chair of Decision Sciences, Institute of Transport and Logistics Studies, The University of Sydney
- Matthew Beck, Professor in Infrastructure Management, Institute of Transport and Logistics Studies, The University of Sydney
- Gareth Jude, PhD Candidate, Institute of Transport and Logistics Studies, The University of Sydney

3. Who can take part in the study?

You have been invited to take part in this study because you recently bought goods online and chose to receive your order using a;

- click and collect service
- retailer parcel locker
- retailer location aware application that tracks delivery to your home

4. What will the study involve for me?

If you decide to take part in this study, you will be asked to complete an online survey of approximately 10 minutes duration. You will be asked to respond to a series of questions based on your pick-up or delivery choice and some general demographics. Return of the completed survey indicates your consent to participate.

5. Can I withdraw once I've started?

Being in this study is completely voluntary and you do not have to take part. Your decision will not affect your current or future relationship with the researchers or anyone else at The University of Sydney.
You may change your mind at any time and withdraw from the study by closing the survey. Any information that has already been collected will not be saved or used. There are no personal consequences for you if you decide to withdraw or not to participate.

6. Are there any risks or costs?

Aside from giving up your time, we do not expect that there will be any risks or costs associated with taking part in this study.

7. Are there any benefits?

You will be rewarded for your participation; this reward will be managed by your panel provider.

8. Privacy and Confidentiality

The data for this project is being collected anonymously by Qualtrics from your panel provider. It will then be forwarded to researchers at the University of Sydney. The data are being coded by assigning a random number for each participant. Therefore, neither the researchers nor anyone else will be able to link data to you and your privacy will be maintained throughout the survey and data analysis. The anonymous data will be stored stored on secure server at the University of Sydney. Only the Principal Investigators will have access to the data. The results of this study may be published or presented at professional meetings, but the identities of all research participants will remain anonymous.

9. Will I be told the results of the study?

You have a right to receive feedback about the overall results of this study. You can contact Gareth Jude gareth.jude@sydney.edu.au to receive a copy. This feedback will be in the form of a brief lay summary.

10. What if I would like further information?

When you have read this information, the following researcher/s will be available to discuss it with you further and answer any questions you may have:

- Ben Fahimnia, Professor and Chair of Decision Sciences, Institute of Transport and Logistics Studies, +61 2 9114 1801, ben.fahimnia@sydney.edu.au
- Gareth Jude, PhD Candidate Institute of Transport and Logistics Studies, gareth.jude@sydney.edu.au

11. What if I have a complaint or any concerns?

The ethical aspects of this study have been approved by the Human Research Ethics Committee (HREC) of The University of Sydney [Project No.2021/976] according to the *National Statement on Ethical Conduct in Human Research (2007).*

If you are concerned about the way this study is being conducted or you wish to make a complaint to someone independent from the study, please contact the University:

Human Ethics Manager
human.ethics@sydney.edu.au
+61 2 8627 8176

Appendix B : Participant consent and survey instrument

Start of Block: Introduction

Introduction: You are invited to take part in this research study involving online shopper behaviour. The objective is to understand what makes people choose a particular type of delivery or pick up for their online retail orders so that this behaviour is better understood and ways of improving the delivery/pick-up experience can be examined. We are particularly interested in why people chose to receive their online orders using **CLICK AND COLLECT** (pick up from a retail store), a **RETAILER PARCEL LOCKER** (pick up from a locker in a retail store excluding Australia Post) or a **RETAILER LOCATION AWARE TRACKING APP** (a retailer app that allows you to track delivery e.g. Domino's Pizza Tracker) as opposed to normal home delivery**.** All aspects of the study, including results, will be strictly confidential and your responses are anonymous. The survey will take approx. 10 minutes to complete. To download and view the participant information statement click here Pis v2

End of Block: Introduction

Start of Block: Consent

I agree to take part in this research study. In giving my consent, I confirm that:

• I have read the Participant Information Statement.

• I understand the purpose of the study, what I will be asked to do, and any risks/benefits involved.

• I understand that being in this study is completely voluntary.

• I am assured that my decision to participate will not have any impact on my relationship with the research team or the University of Sydney.

• I understand that I am free to withdraw from this study at any time.

• I have been informed that the confidentiality of the information I provide will be protected and will only be used for purposes that I have agreed to. I understand that information about me will only be told to others with my permission, except as required by law.

• I understand that the results of this study may be published, and that publications will not contain my name or any identifiable information about me.

I voluntarily agree to take part in this study and consent to my responses being collected

- ○ Yes (1)
- ○ No (2)

To which age group do you belong? (select only one option)

- ○ Under 18
- ○ 18-24
- ○ 25-34
- ○ 35-44
- ○ 45-55
- ○ 55+

Skip To: End of Block If To which age group do you belong? (select only one option) = Under 18

End of Block: Consent

Start of Block: Section A: Online Shopping Behaviour

Q1 How often do you shop online? (choose one option)

- ○ At least once a week
- ○ At least once a month
- ○ At least once every three months
- ○ At least once a year
- ○ Less than once a year

Q2 How often do you use **CLICK AND COLLECT** (pick up from a retail store), a **RETAILER PARCEL LOCKER** (pick up from a locker in a retail store excluding Australia Post) or a

RETAILER LOCATION AWARE TRACKING APP (a retailer app that allows you to track delivery e.g. Domino's Pizza Tracker) to get your order? (choose one option)

- ○ At least once a week
- ○ At least once a month
- ○ At least once every three months
- ○ At least once a year
- ○ Less than once a year

Q25 Which of these services do you use most often? (choose one option)

- ○ Pick up from a RETAILER PARCEL LOCKER (pick up from a locker in a retail store excluding Australia Post)
- ○ Home Delivery using a RETAILER LOCATION AWARE TRACKING APP (a retailer app that allows you to track delivery e.g. Domino's Pizza Tracker)
- ○ CLICK AND COLLECT (pick up from a retail store)
- ○ None of the above (screened out)

Skip To: End of Block If Which of these services do you use most often? (choose one option)!= None of the above

Q4 Which of these services did you use most recently? (choose one option)

- ○ Home Delivery using a RETAILER LOCATION AWARE TRACKING APP (a retailer app that allows you to track delivery e.g. Domino's Pizza Tracker)
- ○ CLICK AND COLLECT (pick up from a retail store)
- ○ Pick up from a RETAILER PARCEL LOCKER (pick up from a locker in a retail store excluding Australia Post)

Q5 What was the approximate value of your purchase the last time you used ? (Q4/Choice Group/Selected Choices) (select only one option)

- ○ Less than $30
- ○ Between $30 and $100
- ○ Between $101 and $200
- ○ Between $201 and $500
- ○ More than $500

Q6 Which retailer provided this service?

_____

End of Block: Section A: Online Shopping Behaviour

Start of Block: Section B Choice of delivery or pick up method.

Q7 Different people use **$(**Q4/Choice Group/Selected Choices) for different reasons. Some of these may apply to you and some may not but please indicate how strongly you agree or disagree with each of the following reasons

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
It solves the problems associated with normal home delivery	○	○	○	○	○
It is more useful to me than regular home delivery	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
It satisfies my need for delivery certainty	○	○	○	○	○
It is fun	○	○	○	○	○
It is interesting	○	○	○	○	○
It is enjoyable	○	○	○	○	○
It helps me to feel acceptable	○	○	○	○	○
It improves the way I am perceived	○	○	○	○	○
It makes a good impression on other people	○	○	○	○	○
It gives me social approval	○	○	○	○	○
It has an ethical and moral interest for me	○	○	○	○	○
The environmental improvement compared to regular home delivery is coherent with my ethical and moral values	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I am attracted by the inherent sustainability	○	○	○	○	○
It has ethical and moral value for me	○	○	○	○	○
$(Q6/Choice Text Entry Value) feels responsible	○	○	○	○	○
$(Q6/Choice Text Entry Value) is reliable	○	○	○	○	○
$(Q6/Choice Text Entry Value) is trustworthy	○	○	○	○	○
$(Q6/Choice Text Entry Value) is dependable	○	○	○	○	○
$(Q6/Choice Text Entry Value) } is totally awesome	○	○	○	○	○
I love $(Q6/Choice Text Entry Value)	○	○	○	○	○
I am passionate about $(Q6/Choice Text Entry Value)	○	○	○	○	○
I am very attached to $(Q6/Choice Text Entry Value)	○	○	○	○	○

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
I feel comfortable using the service on my own	○	○	○	○	○
I can easily operate the service on my own	○	○	○	○	○
I feel comfortable using the service even if there is no one around me to tell me how to use it	○	○	○	○	○

Q8 Now thinking about normal home delivery, what are some of the problems you experience? (Select all options that apply)

- ○ Arrives when I am not home
- ○ Delivery windows are too wide
- ○ Being "carded" and having to arrange pick up from another location
- ○ Tracking is ineffective
- ○ Deliveries take too long to arrive
- ○ Excessive and unnecessary packaging
- ○ Environmental impacts
- ○ Lack of security when goods are left outside my residence
- ○ Rough handling by deliverers
- ○ High delivery charges
- ○ Other (enter text) _____

Q9 Why is $(Q4/Choice Group/Selected Choices) more useful to you than normal home delivery? (Select all options that apply)

- ○ No need to worry about being home to receive a delivery
- ○ I can get the products at a time convenient to me
- ○ No extra trips to pick up goods after being "carded"
- ○ It's a quicker way of getting the products I order
- ○ No excessive and unnecessary packaging
- ○ Less environmental impacts
- ○ I feel more secure knowing I have the product in my hands
- ○ I receive the goods in better condition
- ○ No delivery fees
- ○ Other (enter text) _____

End of Block: Section B Choice of delivery or pick up method.

Start of Block: Section C Demographics

Q11 How do you identify? (select only one option)

- ○ Man
- ○ Woman
- ○ Non-binary / third gender
- ○ Prefer not to say

Q12 Please share your household gross income bracket (select only one option)

- ○ Under $25,000 per year
- ○ $25,000 to $49,999 per year
- ○ $50,000 to $99,999 per year
- ○ $100,000 to $199,999 per year
- ○ Over $200,000 per year
- ○ Rather not say

Q13 Indicate your highest level of education (select only one option)

- ○ Year 11 or below
- ○ Year 12
- ○ Certificate III/IV
- ○ Diploma/Advanced Diploma
- ○ Bachelor Degree
- ○ Graduate Diploma
- ○ Postgraduate Degree

Q14 Enter your postcode number

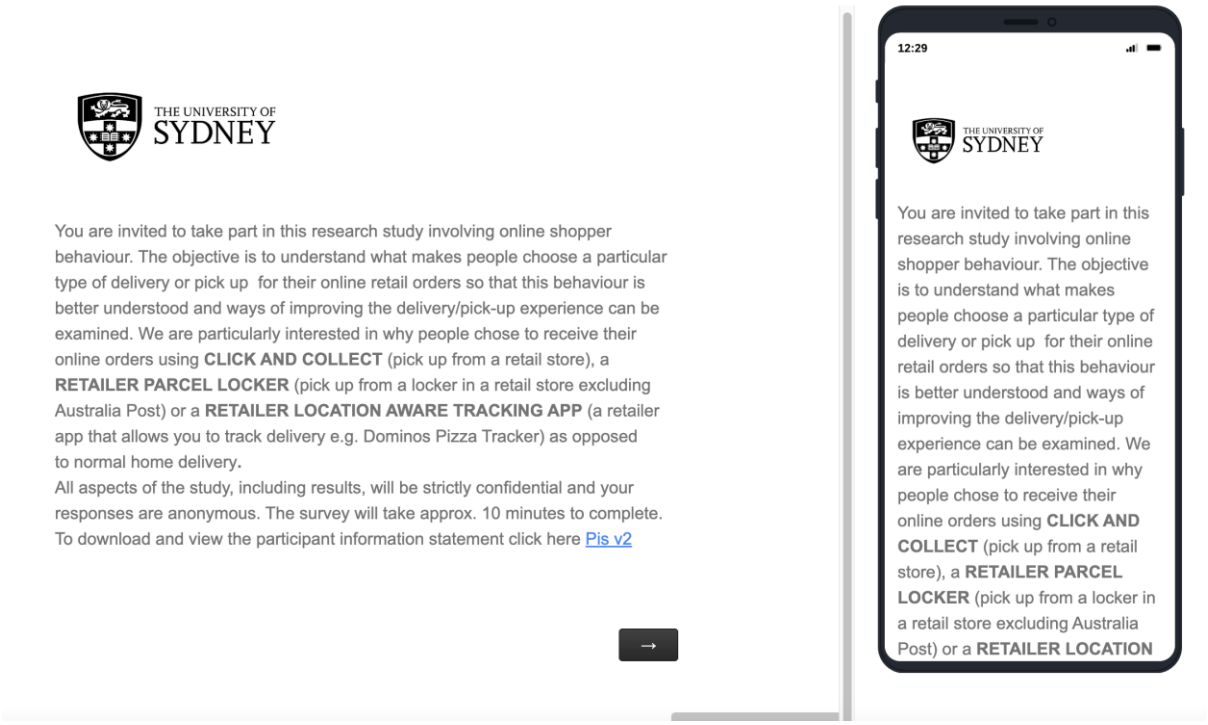
_____

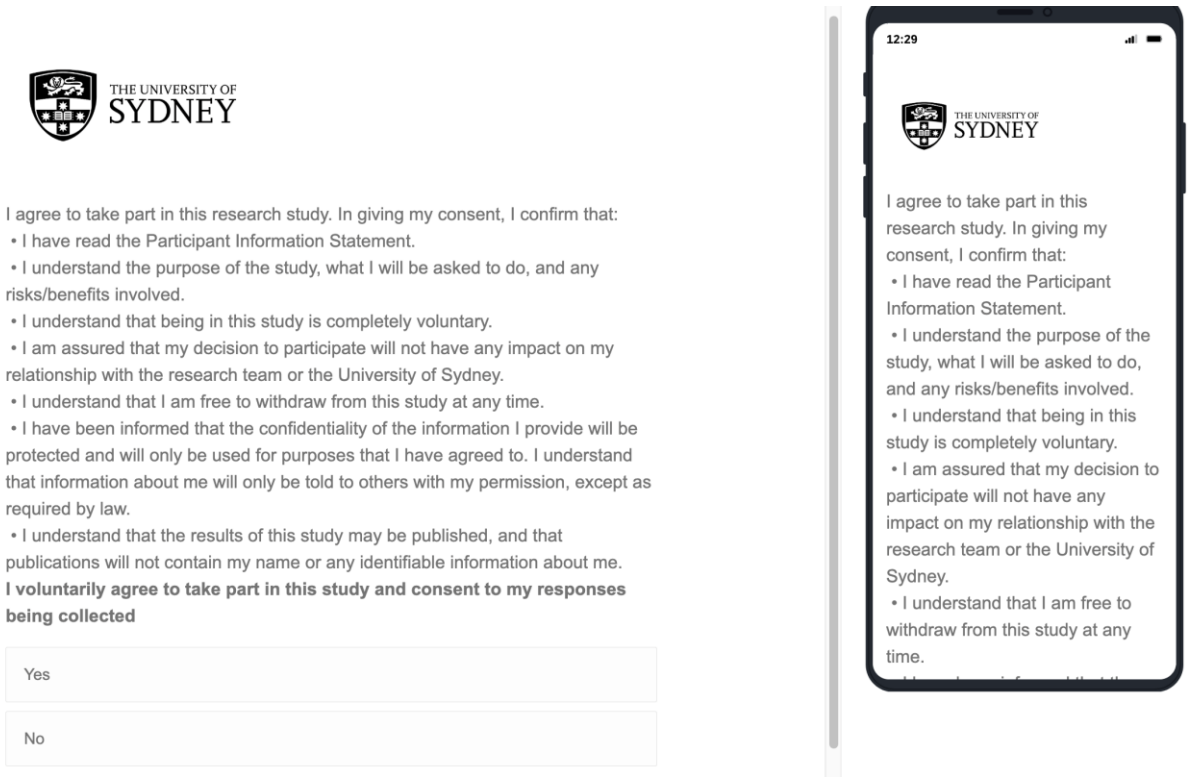
Q29 In which Australian State or Territory do you live?

- ○ New South Wales
- ○ Victoria
- ○ Queensland
- ○ South Australia
- ○ Western Australia
- ○ Tasmania
- ○ Northern Territory
- ○ Australian Capital Territory

End of Block: Section C Demographics

Appendix C : Screen shots of survey layout on digital devices





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To which age group do you belong? (select only one option)

- Under 18
- 18-24
- 25-34
- 35-44
- 45-55
- 55+

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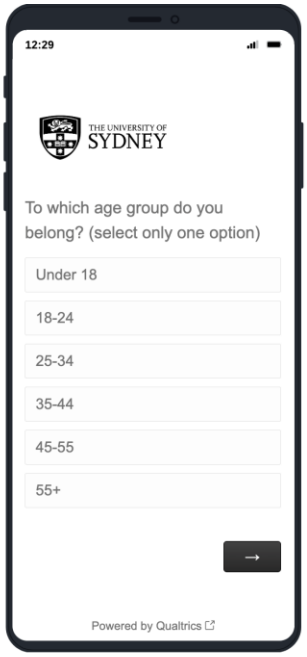

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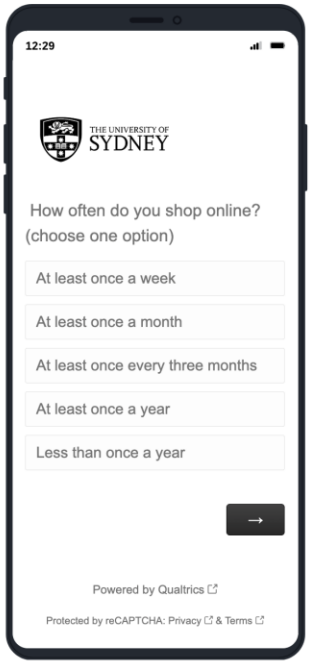
How often do you shop online? (choose one option)

- At least once a week
- At least once a month
- At least once every three months
- At least once a year
- Less than once a year

→



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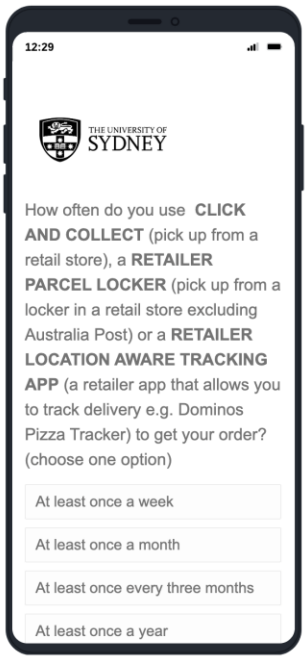
How often do you use **CLICK AND COLLECT** (pick up from a retail store), a **RETAILER PARCEL LOCKER** (pick up from a locker in a retail store excluding Australia Post) or a **RETAILER LOCATION AWARE TRACKING APP** (a retailer app that allows you to track delivery e.g. Dominos Pizza Tracker) to get your order? (choose one option)

- At least once a week
- At least once a month
- At least once every three months
- At least once a year
- Less than once a year

→



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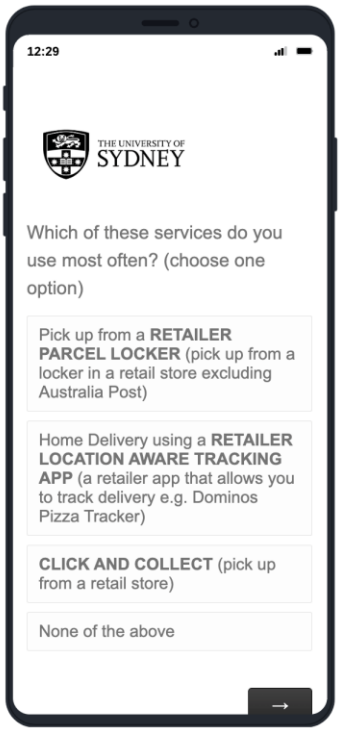
hich of these services do you use most often? (choose one option)

- Pick up from a **RETAILER PARCEL LOCKER** (pick up from a locker in a retail store excluding Australia Post)
- Home Delivery using a **RETAILER LOCATION AWARE TRACKING APP** (a retailer app that allows you to track delivery e.g. Dominos Pizza Tracker)
- **CLICK AND COLLECT** (pick up from a retail store)
- None of the above

→



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Which of these services did you use most recently? (choose one option)

Home Delivery using a **RETAILER LOCATION AWARE TRACKING APP** (a retailer app that allows you to track delivery e.g. Dominos Pizza Tracker)

CLICK AND COLLECT (pick up from a retail store)

Pick up from a **RETAILER PARCEL LOCKER** (pick up from a locker in a retail store excluding Australia Post)

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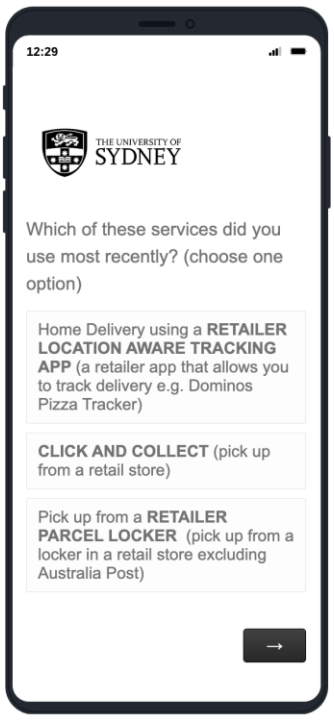

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What was the approximate value of your purchase the last time you used ? Pick up from a **RETAILER PARCEL LOCKER** (pick up from a locker in a retail store excluding Australia Post) (select only one option)

Less than $30

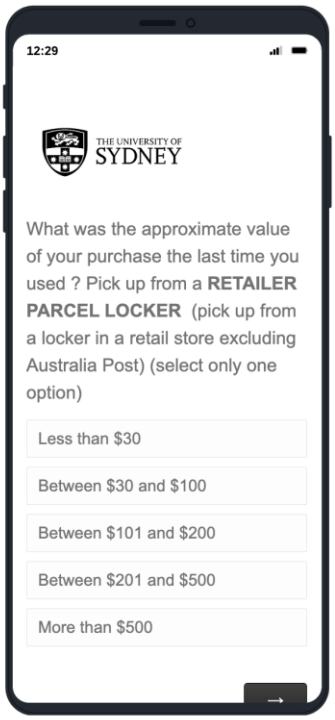
Between $30 and $100

Between $101 and $200

Between $201 and $500

More than $500

→



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Which retailer provided this service?

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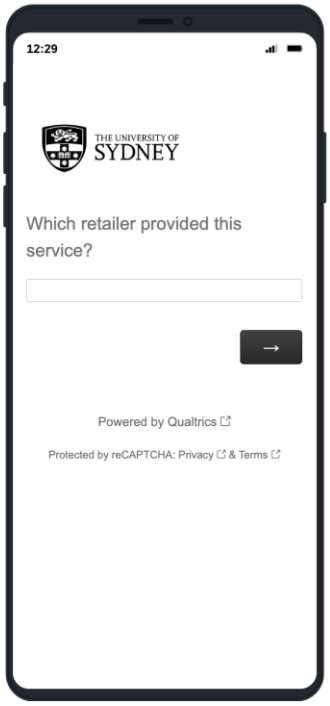

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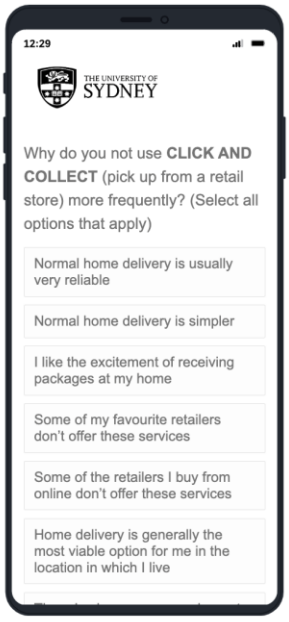
Why do you not use **CLICK AND COLLECT** (pick up from a retail store) more frequently? (Select all options that apply)

- Normal home delivery is usually very reliable
- Normal home delivery is simpler
- I like the excitement of receiving packages at my home
- Some of my favourite retailers don't offer these services
- Some of the retailers I buy from online don't offer these services
- Home delivery is generally the most viable option for me in the location in which I live
- There is always someone home to receive a delivery
- There is a safe place where anything I order can be stored if I am not home to receive a delivery
- I don't feel safe leaving my home to pick up a delivery
- I don't feel confident navigating the app and retailer processes that are required
- It's just an extra hassle I don't need
- Other (enter text in box below)



EPSON

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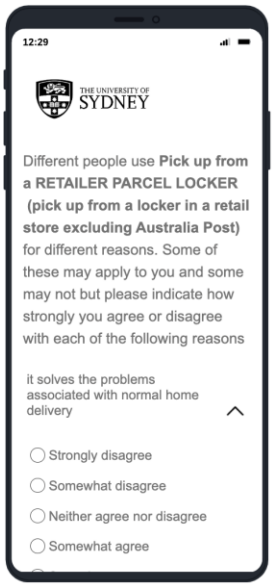
Different people use **Pick up from a RETAILER PARCEL LOCKER (pick up from a locker in a retail store excluding Australia Post)** for different reasons. Some of these may apply to you and some may not but please indicate how strongly you agree or disagree with each of the following reasons

	Strongly disagree	Somewhat disagree	Neither agree nor disagree	Somewhat agree	Strongly agree
it solves the problems associated with normal home delivery	○	○	○	○	○
It is more useful to me than regular home delivery	○	○	○	○	○
It satisfies my need for delivery certainty	○	○	○	○	○
It is fun	○	○	○	○	○
It is interesting	○	○	○	○	○
It is enjoyable	○	○	○	○	○
It helps me to feel acceptable	○	○	○	○	○
It improves the way I am perceived	○	○	○	○	○
It makes a good impression on other people	○	○	○	○	○
It gives me social approval	○	○	○	○	○
It has an ethical and moral interest for me	○	○	○	○	○



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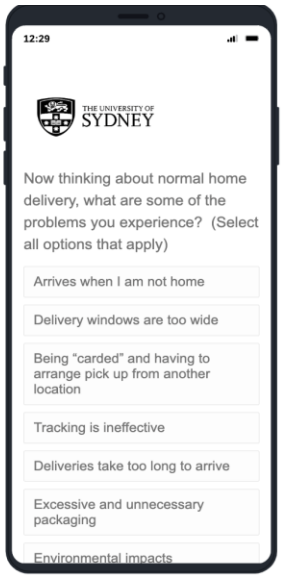
Now thinking about normal home delivery, what are some of the problems you experience? (Select all options that apply)

- Arrives when I am not home
- Delivery windows are too wide
- Being “carded” and having to arrange pick up from another location
- Tracking is ineffective
- Deliveries take too long to arrive
- Excessive and unnecessary packaging
- Environmental impacts
- Lack of security when goods are left outside my residence
- Rough handling by deliverers
- High delivery charges
- Other (enter text)



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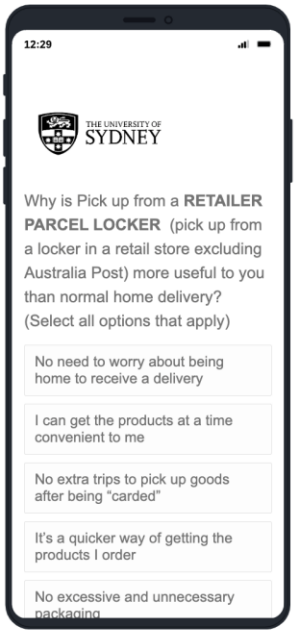
Why is Pick up from a **RETAILER PARCEL LOCKER** (pick up from a locker in a retail store excluding Australia Post) more useful to you than normal home delivery? (Select all options that apply)

- No need to worry about being home to receive a delivery
- I can get the products at a time convenient to me
- No extra trips to pick up goods after being "carded"
- It's a quicker way of getting the products I order
- No excessive and unnecessary packaging
- Less environmental impacts
- I feel more secure knowing I have the product in my hands
- I receive the goods in better condition
- No delivery fees
- Other (enter text)



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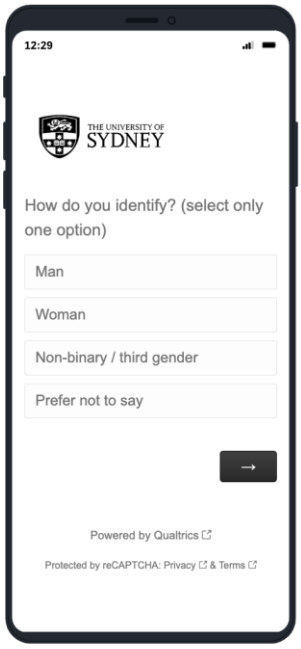
How do you identify? (select only one option)

- Man
- Woman
- Non-binary / third gender
- Prefer not to say

→



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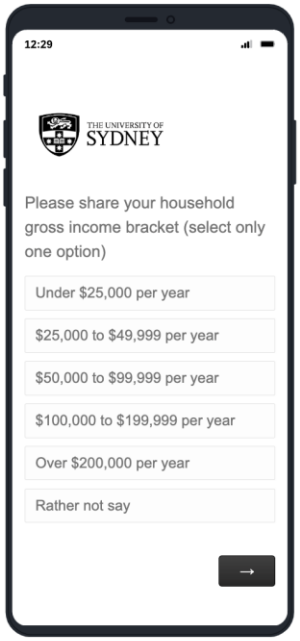
Please share your household gross income bracket (select only one option)

- Under $25,000 per year
- $25,000 to $49,999 per year
- $50,000 to $99,999 per year
- $100,000 to $199,999 per year
- Over $200,000 per year
- Rather not say

→



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Indicate your highest level of education (select only one option)

- Year 11 or below
- Year 12
- Certificate III/IV
- Diploma/Advanced Diploma
- Bachelor Degree
- Graduate Diploma
- Postgraduate Degree

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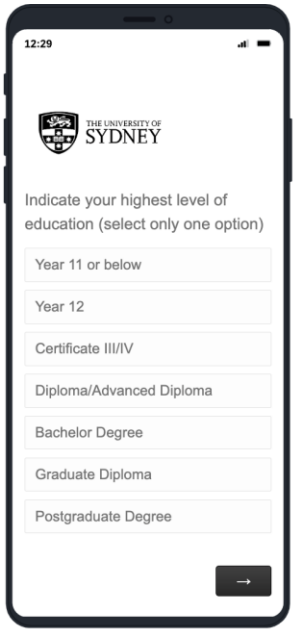

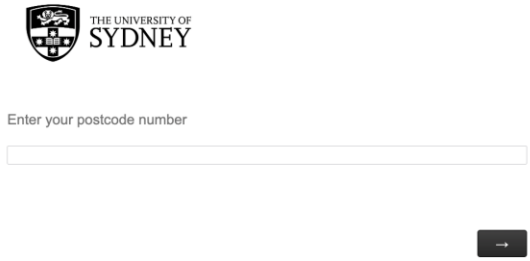

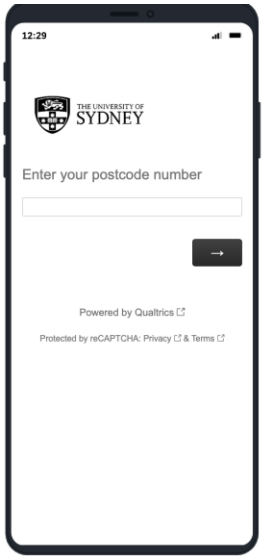

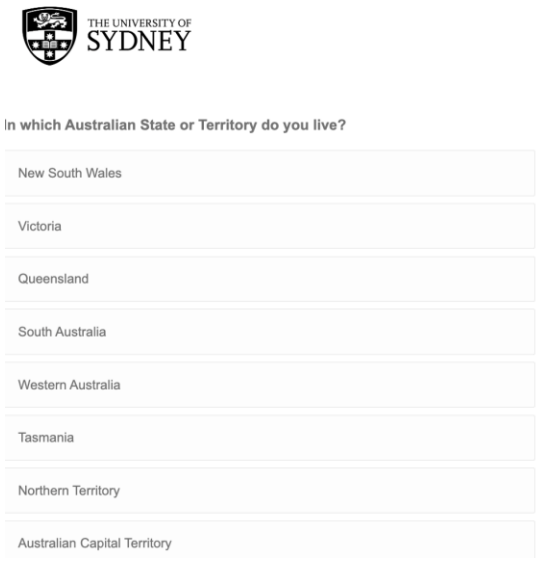

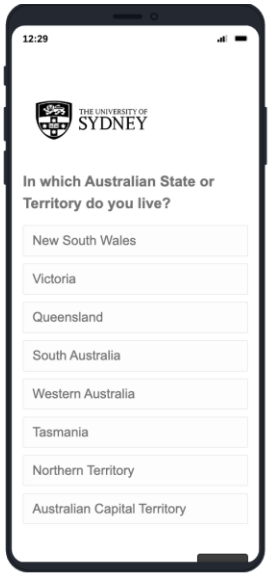

Thank you for taking this survey. Your response has been recorded successfully. You may now close this window.

Appendix D : Ethics approval

THE UNIVERSITY OF SYDNEY

Research Integrity & Ethics Administration
HUMAN RESEARCH ETHICS COMMITTEE

Thursday, 3 February 2022

Prof Behnam Fahimnia
Institute of Transport and Logistics Studies (ITLS); University of Sydney Business School
Email: behnam.fahimnia@sydney.edu.au

Dear Behnam,

The University of Sydney Human Research Ethics Committee (HREC) has considered your application.

I am pleased to inform you that after consideration of your response, your project has been approved.

Details of the approval are as follows:

Project No.:	**2021/976**
Project Title:	**Consumer motivation to collaborate in last mile logistics**
Authorised Personnel:	**Fahimnia Behnam; Beck Matthew; Jude Gareth;**
Approval Period:	**03/02/2022** to **03/02/2026**
First Annual Report Due:	**03/02/2023**

Documents Approved:

Date Uploaded	Version Number	Document Name
20/01/2022	Version 2	Participant Information Statement v2
09/12/2021	Version 1	Questionnaire
26/11/2021	Version 1	Consent Form
26/11/2021	Version 1	Qualtrics ESOMAR information sheet
26/11/2021	Version 1	Introductory Letter

Condition/s of Approval

- Research must be conducted according to the approved proposal.
- An annual progress report must be submitted to the Ethics Office on or before the anniversary of approval and on completion of the project.
- You must report as soon as practicable anything that might warrant review of ethical approval of the project including:
  - Serious or unexpected adverse events (which should be reported within 72 hours).
  - Unforeseen events that might affect continued ethical acceptability of the project.
- Any changes to the proposal must be approved prior to their implementation (except where an amendment is undertaken to eliminate *immediate* risk to participants).
- Personnel working on this project must be sufficiently qualified by education, training and experience for their role, or adequately supervised. Changes to personnel must be reported and approved.
- Personnel must disclose any actual or potential conflicts of interest, including any financial or other interest or affiliation, as relevant to this project.
- Data and primary materials must be retained and stored in accordance with the relevant legislation and University guidelines.

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Research Portfolio
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ABN 15 211 513 464
CRICOS 00026A

THE UNIVERSITY OF SYDNEY

- Ethics approval is dependent upon ongoing compliance of the research with the *National Statement on Ethical Conduct in Human Research*, the *Australian Code for the Responsible Conduct of Research*, applicable legal requirements, and with University policies, procedures and governance requirements.
- The Ethics Office may conduct audits on approved projects.
- The Chief Investigator has ultimate responsibility for the conduct of the research and is responsible for ensuring all others involved will conduct the research in accordance with the above.

This letter constitutes ethical approval only.

Please contact the Ethics Office should you require further information or clarification.

Sincerely,

Appendix E: Literature Review Descriptive Analysis

In this section, we present a descriptive analysis of the identified articles. This step has two parts. In the first part, we present a descriptive analysis of the identified articles. In the second part, we analyse the theories used to explain the antecedents that motivate SCC and relate these to the elements of the initial framework.

The articles in the directly relevant group were published between 2005 and 2023. On average, just over two articles have been published in each year since 2005, and the publication rate is not growing. The articles in the relevant group, dealing with outcomes rather than antecedents of SCC, were published between 1999 and 2023. On average, just over four articles have been published in each year since 1999, and the rate of publication is growing slightly (Figure 2.2). No one journal dominates the publication list. The publication of the directly relevant group of 38 articles spans 23 journals, of which only *Benchmarking*, *International Journal of Production Economics*, and *Supply Chain Management: An International Journal* have published three or more articles. The publication profile of the relevant articles group is similarly spread with 100 articles in 35 journals. The modest publication rate and the lack of a dominant group of publishing journals demonstrate that both the antecedents and the outcomes of SCC have been significantly overlooked by SC scholars.

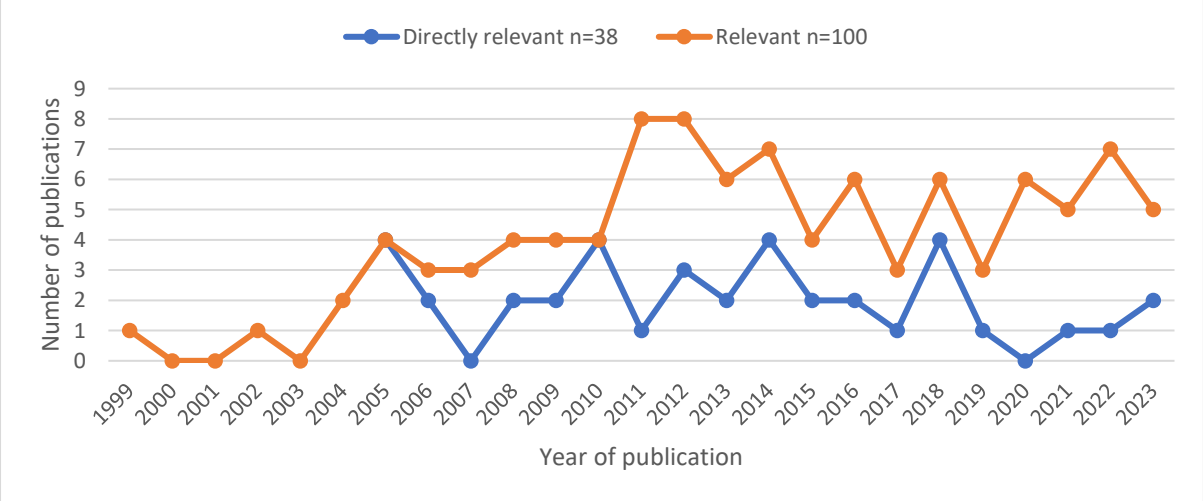


Figure AE 1: Publication years of articles in the synthesis sample

A wide range of industries and geographical locations are used as research contexts in the directly relevant articles: 45% of the articles collect data from multiple industries, 32% from manufacturing, 21% from retail SCs, and 13% from specific industry sectors such as petroleum, flowers and wood, while 45% of the articles collect their data from Asia (including China), 34%

from the US, 13% from Europe, and 5% across continents. The wide range of industries and geographies indicates that the thematic analysis will not be skewed toward a particular industry or geographical context.

The most frequently used research method in the synthesis sample is survey, appearing in 79% of the studies in the directly relevant articles group and 61% of the relevant articles group. This indicates limited methodological diversity in the sample. In the directly relevant articles sample, which is the primary focus of the thematic analysis, a qualitative perspective is provided by seven case studies. One study (Fawcett et al., 2008) uses a mixed methods approach combining survey methodology with 51 case interviews.

Theoreis Used: Of the 38 directly relevant articles, 15 use one or multiple theories to explain SCC motivation. A total of 18 different theories are used, indicating the diversity of theories to explain engagement in SCC. Of the 100 relevant articles, 31 are based on established theories but because these articles are not primarily concerned with the antecedents that motivate engagement in SCC, the profile of theories used is different. The most frequently used theories used are transaction cost economics (Williamson, 1975, 2008) and the resource-based view (Barney, 1991). Many of the other theories used are closely related to these two theories and can be grouped together. The group related to transaction cost economics is concerned with exchange behaviours and the group related to the resource-based view with the sharing of resources. The following describes how the two groups were used in previous studies.

Exchange behaviour theories

(1) Social exchange theory (Emerson, 1976; Thibault & Kelley, 1959) was introduced in Section 2.1 to help justify the inclusion of perceived value and relationships in the initial framework. Wu et al. (2014) used social exchange theory to explain the relationship between the perceived value available from SCC and the relational drivers of engagement.

(2) Transaction cost economics (Williamson, 1975, 2008) was introduced in Section 2.1 to justify the inclusion of systems and processes, and context in the initial framework. Zander et al. (2016) used transaction cost economics to explain the relationship between asset specificity and supply uncertainty on network forms of governance.

(3) Relational exchange theory builds on transaction cost economics proposing that relational factors, particularly trust, complement traditional economic measures in governing exchange

relationships (Ring & Van De Ven, 1992; Zaheer & Venkatraman, 1995). Pimentel Claro et al. (2006) used relational exchange theory in combination with transaction cost economics to build a framework of collaboration engagement finding that both relational factors (trust, commitment) and economic factors (asset specificity and environmental uncertainty) influence SCC engagement and performance.

(4) Relational contracting theory (Macneil, 1980) originates in the discipline of law and posits that there are two types of contracts between businesses: relational and discrete. Relational contracts, such as SCC, are not governed by traditional written artefacts but rather by relational norms that generate successful exchanges. Myhr and Spekman (2005) used relational contracting theory to justify including trust as an independent variable in a SCC framework.

(5) Justice theory posits that higher levels of perceived justice motivate the willingness to exchange and to strive for collaborative behaviours and relationship continuity. Justice theory has three major components. Distributive justice refers to equity in reward sharing, procedural justice to fairness in the decision-making process and interactional justice to fairness of the communication process. Wu and Chiu (2018) tested the effects of all three dimensions of justice on SCC, finding that distributive and procedural justice are significant influences while interactional justice is not.

Resource sharing theories

(1) When resources are valuable, rare, imperfectly imitable, and not substitutable and combined in a unique way, they lead to competitive advantage (Barney, 1991). The resource-based view was used by Tsanos and Zografos (2016) to explore the relationship between information integration and SC coordination on the supply and demand side. They found the demand side relationship to be strong and statistically significant and the supply side relationship to be moderate and statistically significant.

(2) The relational view (Dyer & Singh, 1998) complements and extends the resource-based view by identifying a class of assets that exist not within each of the collaborating firms, but which are created as a result of the collaboration itself. These assets generate "relational rents,' which are supernormal profits generated in a collaborative relationship that could not be generated by the individual partners in isolation. Zhang and Cao (2018) used the relational view to justify the inclusion of interorganisational systems appropriation in a framework of

SCC engagement. They found interorganisational systems use improved SCC and partially mediated the relationship between collaborative culture and SCC.

(3) The extended resource-based view (Lavie, 2006) posits that firms can generate competitive advantage from resources without having those resources fully under their ownership or control. Zhang and Cao (2018) used the extended resource-based view to explain the motivation of actors to engage in SCC.

(4) Social capital theory proposes that a network provides value to its members by allowing them access to the social resources that are embedded within it (Nahapiet & Ghoshal, 1998). Wu and Chiu (2018) tested the effect of three components of social capital on engagement in SCC. Structural capital was found to have a significant effect on collaboration, but cognitive and relational capital were not.

(5) Commitment trust theory (Morgan & Hunt, 1994) proposes that commitment and trust facilitate access to resources through cooperation and information and knowledge sharing which in turn reduces conflicts, opportunism, and uncertainty. W.-T. Wang et al. (2023) used the theory to test the effect of trust and various dimensions of commitment on collaborative behaviour. They found that trust has a positive and significant impact on both commitment and collaboration.

(6) Learning theory posits that the motivation for organisations to form collaboration is gaining the resource of knowledge held within partner organisations (Barringer & Harrison, 2000). Zander et al. (2016) used learning theory to test the effect of knowledge sharing on the desire to collaborate. They found that knowledge sharing moderates the relationship between supply uncertainty and adoption of network forms of governance.

(7) Network theory argues that an organisation's network of relationships (customers, suppliers, competitors) contains a diverse range of resources which, if accessed, can create reciprocal knowledge and distinctive competencies (Harland, 1996). Pimentel Claro et al. (2006) cited network theory in their research design but did not empirically test it.

(8) Service dominant logic proposes that value creation occurs in networks in which resources are exchanged among multiple actors and is therefore more accurately conceptualised as value cocreation (Vargo & Lusch, 2008). Lindsey Hall et al. (2022) used service dominant logic principles in a study testing the effect of collaborative feedback and partnership

investment on the formation of inter-firm collaboration. They found both demonstrate positive effects.

Both exchange and resource-based theories suggest that (1) collaboration creates perceived value either by making exchanges more efficient and effective or by allowing access to resources that would be unavailable in a purely transactional environment, (2) relationships influence the formation of collaboration by facilitating the sharing of information and resources in a non-contractually governed environment, (3) systems and processes facilitate and govern collaborative relationships and their presence creates a valuable interorganisational resource, and (4) the collaborative context, like environmental uncertainty, directly influences the formation of collaborative relationships.

Appendix F : Descriptive analysis of results

Descriptive analysis was conducted to provide some background and context to the collaborative behaviour of the respondents. The descriptive analysis was performed using Excel and SPSS20.

AF 1 Frequency of online shopping vs collaboration in last mile logistics

All of the respondents use both home delivery and collaborative methods to receive their online orders. On average home delivery is used more frequently than collaborative methods (Table 5.3 and Figure 5.1), even though the sample is drawn from recent last mile logistics collaborators. This suggests that collaboration in last mile logistics is a choice which is made by consumers in certain circumstances and not in others.

Table AF1: Frequency of online shopping vs frequency of collaboration in last mile logistics

	Online shopping Frequency		Collaboration Frequency	
Frequency	Count	%	Count	%
At least once a week	178	47.6%	98	26.2%
At least once a month	137	36.6%	122	32.6%
At least once every 3 months	43	11.5%	76	20.3%
At least once a year	10	2.7%	28	7.2%
Less than once a year	6	1.6%	50	13.4%
Total	374	100.0%	374	100.0%

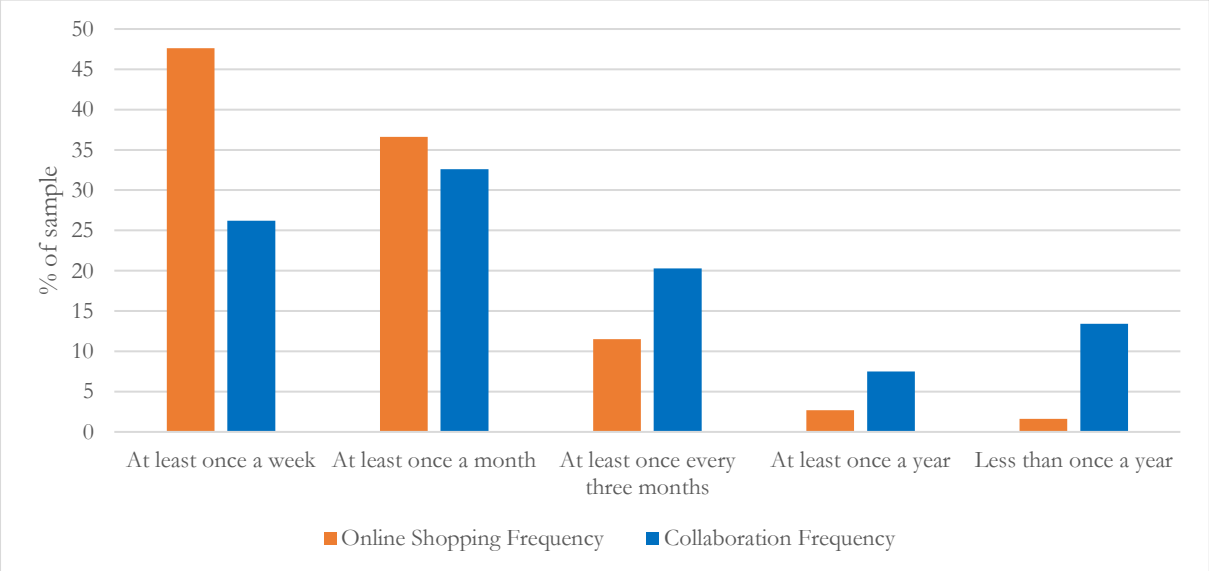


Figure AF1: Online shopping frequency vs collaboration frequency (n=374)

Attitudinal indicators: The survey was designed such that a set of attitudinal indicators were deployed to measure seven latent constructs: economic value, hedonic value, social value, altruistic

value, brand trust, brand love and self-efficacy. Figure 5.2 displays the average, standard deviation and 95% confidence interval for each of those individual indicators. Of the 14 value indicators, 11 are significantly above the mid-point (3) of the 5-point scale which shows that consumers perceive the value derived from collaboration in last mile logistics to be positive. The positive perception is observed across multiple dimensions of value. This contrasts with B2B collaborations which are driven primarily by economic values (see Section 2.4.1). Economic value is, however, the most important dimension for consumers too, as reflected in highest average indicator scores and lowest average standard deviations. The indicator with the highest average score (3.87) is E3 "It satisfies my need for delivery certainty". Social value is the value dimension with the lowest average scores and highest average standard deviations. The indicator with the lowest average score (2.85) and the only indicator significantly below the mid-point is S4 "It gives me social approval".

Among the three other latent constructs, brand trust has the highest average scores and lowest average standard deviations. BT3 "The retailer most recently collaborated with is trustworthy" is the indicator with the highest average score (4.07). This suggests that brand trust is an important condition of collaboration in last mile logistics for consumers. Conversely, brand love has the lowest average scores and highest average standard deviations. BL3 "I am passionate about the retailer I most recently collaborated with" is the indicator with the lowest average score (3.45) in this group. The lower scores are expected and reflect the hierarchical relationship between brand trust and brand love.

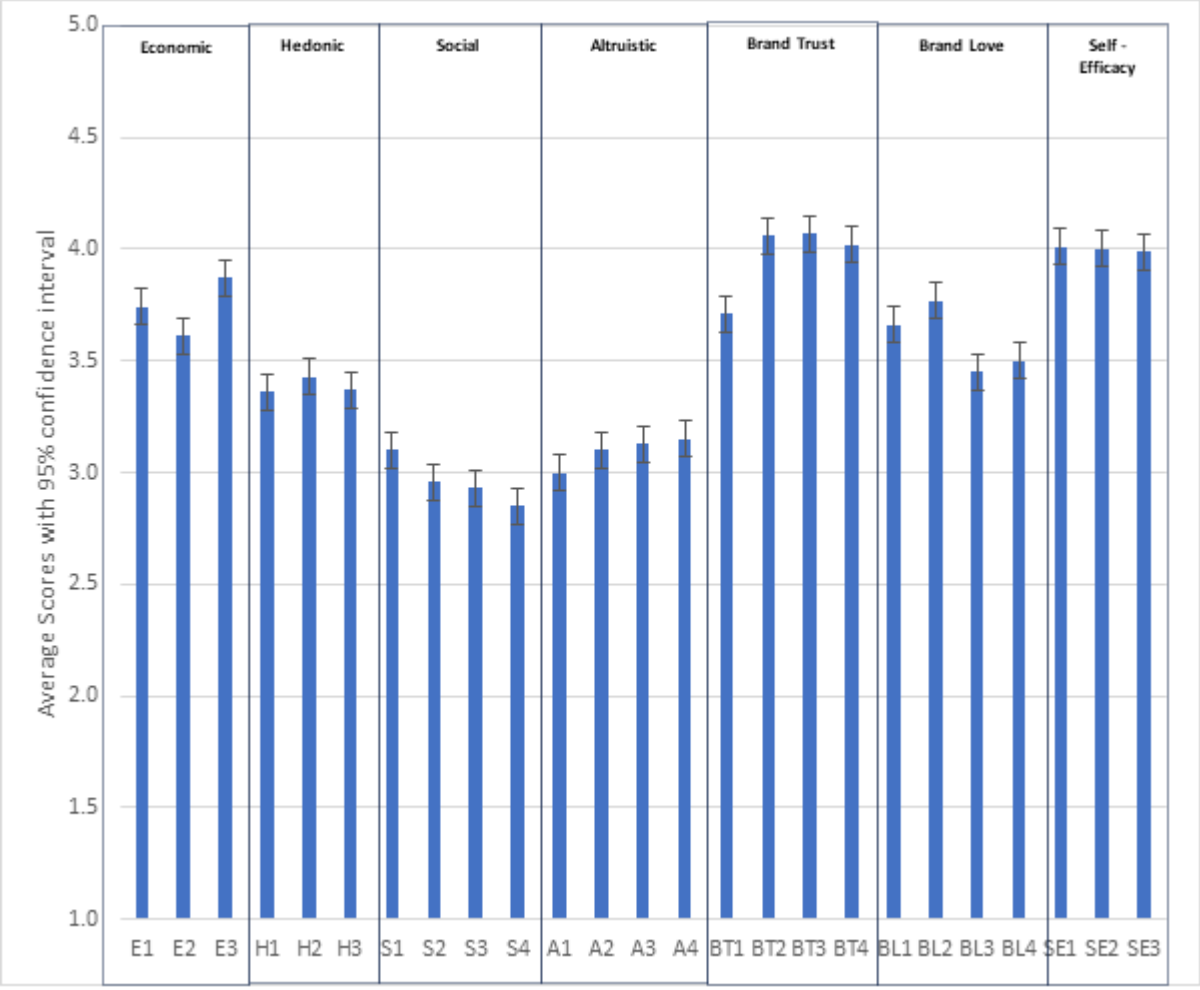


Figure AF2: Item indicator scores on 5-point scale (whiskers are 95% confidence intervals)

Type of value derived by collaboration frequency: To gain an initial view of the type of value derived by collaboration frequency, we deployed a technique similar to that used to calculate net promoter score. Net promoter score was first developed in the commercial sector by Bain and Company and was first described in the literature by Reichheld (2003). It is intended to be a single number measure of customer satisfaction. To calculate net promoter score, customers are first asked to rate a service interaction then the percentage of customers who answer negatively ('detractors') are subtracted from those who answer positively ('promoters'). Neutral responses are discarded.

Respondents were offered five levels of collaboration frequency in the survey (see Appendix B). However, only a small number of responses were collected for option 1 (less than once per year) and option 2 (at least once per year). For the purposes of analysis, these responses were consolidated in a new category "less than once every 3 months". The size of each of the four groups used for analysis can be seen in Table 5.4.

Table AF2: Size of collaboration frequency groups

Collaboration Frequency	Count
Less than once every 3 months	78
At least once every 3 months	76
At least once a month	122
At least once a week	98
Total	374

To calculate a net positive score for each dimension of value, we subtracted the number of negative responses (disagree and strongly disagree) from the number of positive responses (agree and strongly agree) discarding the neutral response (neither agree nor disagree). This gave us a net positive score for each dimension of value. As can be seen in Table 5.5, economic value has the highest net positive score (209) and social value the lowest (-14).

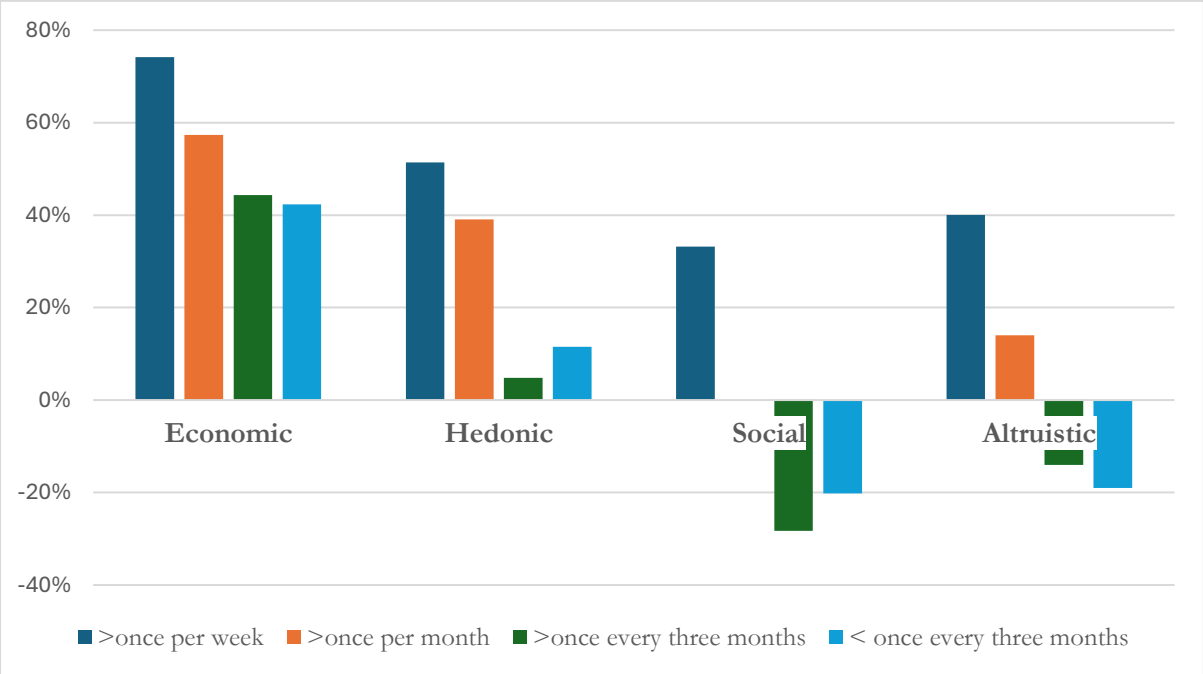
Table AF3: Net positive score for each dimension of value

	Economic	Hedonic	Social	Altruistic
Agree	244	178	120	131
Disagree	35	75	134	102
Net Score	209	103	-14	29

The next step was to calculate a net positive score for each of the four levels of collaboration frequency. The net score was converted to a percentage by dividing it by the total number of responses for that level of collaboration frequency. For example, in the more than once per week category economic value had a net positive score of 73. There were a total of 98 responses in the more than once per week category as a whole meaning 74% of the respondents had a net positive view of economic value (Table 5.6). As can be seen in Table 5.6 and Figure 5.3, perceptions of value generally decline with each level of collaboration frequency. Economic value has the strongest net positive scores across all levels of collaboration frequency. Hedonic value also has positive net scores across all levels of collaboration frequency, but they are lower. Perceptions of social and altruistic value from collaboration turn net negative when collaboration frequency is less than once per month. This demonstrates the importance of economic and hedonic value at all levels of collaboration, but that social and altruistic value in collaboration are only perceived by regular collaborators.

Table AF4: Net positive score by collaboration frequency

	Economic		Hedonic		Social		Altruistic		
	Av. Net	%	Av. Net	%	Av. Net	%	Av. Net	%	Total Sample
>once per week	73	74%	50	51%	33	33%	39	40%	98
>once per month	70	57%	48	39%	0	0%	15	14%	122
>once every 3 months	34	44%	4	5%	-22	-28%	-12	-14%	76
<once every 3 months	33	42%	9	12%	-16	-20%	-14	-19%	78
Total net positive	209	56%	111	30%	-5	-1%	29	9%	374



FigureAF3: Net positive scores for dimensions of value by collaboration frequency

AF2 Utility of home delivery vs collaboration

We collected information on the problems consumers experience with home delivery and the utility they feel collaboration in last mile logistics offers. Respondents were offered nine options and could select as many as they thought appropriate to their experience. In addition, respondents were able to nominate another example of a problem with home delivery or the utility of collaboration. The list of options was compiled from previous research. As can be seen in Figures 5.4 and 5.5, the way respondents rank their problems with home delivery corresponds closely with the utility they perceive in collaboration, suggesting that collaboration in last mile logistics solves many of the problems attributed to home delivery in recent studies (e.g., Shipengine, 2024).

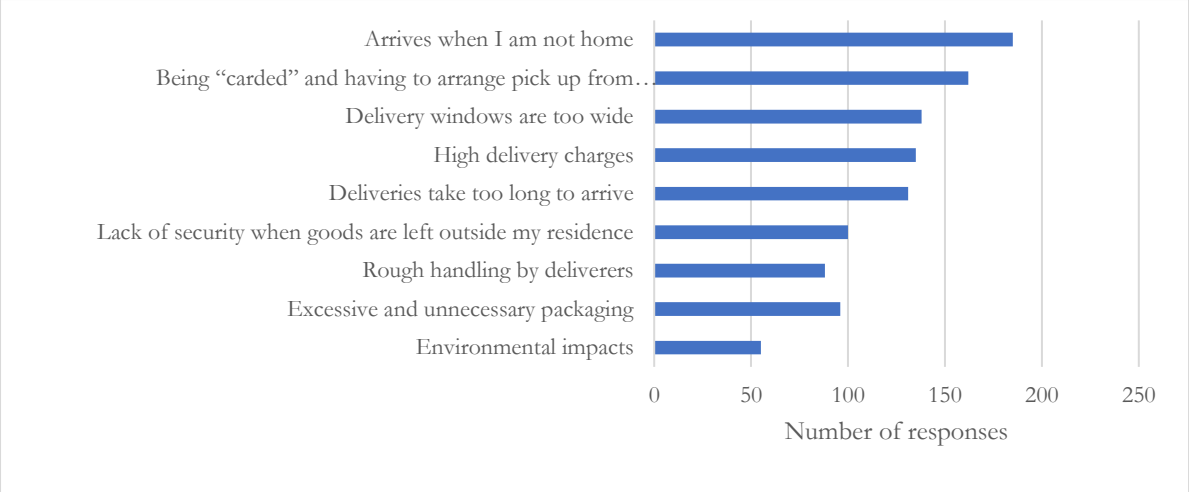


Figure AF4: Home delivery problems: Total number of responses = 1,090, Average number of items selected = 2.63

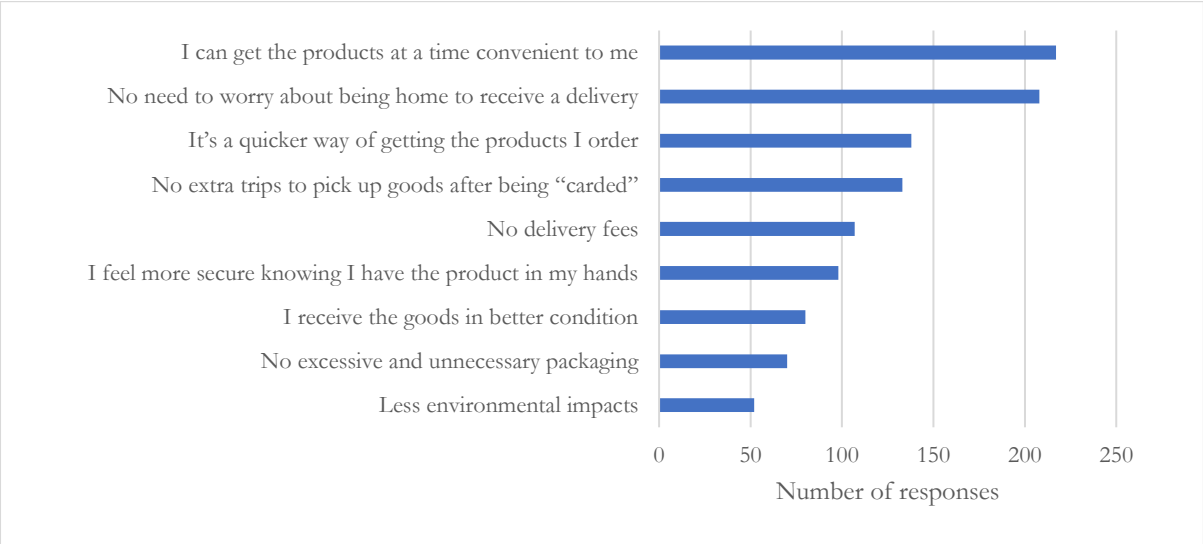


Figure AF4: Utility from collaboration: Total number of responses = 1,103, Average number of items selected = 2.66

AF 3 Distance from CBD vs frequency of collaboration

Other studies have demonstrated the importance of geographical proximity to parcel locker infrastructure as a factor in consumers choosing pick up rather than home delivery (Collins, 2015; Merkert et al., 2022). We were interested to gain an insight into the importance of geographical proximity of infrastructure to all modes of collaboration. As far as we are aware the geographical proximity of retailers who offer click and collect, retailer parcel lockers and location aware delivery apps has not been considered in the literature. To investigate this, we made the very rudimentary assumption that all of the collaborative services being considered by this study are more likely to be offered closer to the central business district (CBD) of a state capital than not. Then, using the domicile postcode provided by the respondents we calculated proximity to their state CBD post

office. Radius from their CBD post office was cross-tabulated with their collaboration frequency. The cross tabulation was repeated based on a radius of 20 km, 30 km, and 40 km from the CBD.

Table 5.7 shows that there appears to be a relationship between proximity of domicile to state capital CBD and the highest level of collaboration frequency. Respondents living within a 20 km and 30 km radius of the state capital are twice as likely to collaborate more than once per week while respondents living within a 40 km radius of the state capital CBD (effectively the state capital metropolitan area boundary) are two and a half time times more likely. This analysis is very rudimentary and relies on some strong assumptions, however it suggests further investigation may be warranted.

Table AF5: Distance from CBD vs collaboration frequency

		< once every three months	% of sample	>once per three months	% of sample	>once per month	% of sample	> once per week	% of sample	Total
20km radius	Outside	45	23%	44	22%	75	38%	35	18%	199
	Inside	33	19%	32	18%	46	26%	63	36%	174
30km radius	Outside	28	20%	32	23%	58	41%	22	16%	140
	Inside	50	21%	44	19%	63	27%	76	33%	233
40km radius	Outside	22	20%	27	24%	48	43%	15	13%	112
	Inside	56	21%	49	19%	73	28%	83	32%	261